Nokia Customer Care

Service Manual

RM-115; RM-126 (Nokia 6126; Nokia 6126h; Nokia 6131; Nokia 6133; Nokia 6133b; Nokia 6133h)

Mobile Terminal

Part No: 9249151 (Issue 1)

COMPANY CONFIDENTIAL

NOKIA

Amendment Record Sheet

Amendment No	Date	Inserted By	Comments
Original issue	04/2006	J Bryman	

Copyright

Copyright © 2006 Nokia. All rights reserved.

Reproduction, transfer, distribution or storage of part or all of the contents in this document in any form without the prior written permission of Nokia is prohibited.

Nokia, Nokia Connecting People, and Nokia X and Y are trademarks or registered trademarks of Nokia Corporation. Other product and company names mentioned herein may be trademarks or tradenames of their respective owners.

Nokia operates a policy of continuous development. Nokia reserves the right to make changes and improvements to any of the products described in this document without prior notice.

Under no circumstances shall Nokia be responsible for any loss of data or income or any special, incidental, consequential or indirect damages howsoever caused.

The contents of this document are provided ”as is“. Except as required by applicable law, no warranties of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, are made in relation to the accuracy, reliability or contents of this document. Nokia reserves the right to revise this document or withdraw it at any time without prior notice.

The availability of particular products may vary by region.

IMPORTANT

This document is intended for use by qualified service personnel only.

Warnings and cautions

Warnings

- IF THE DEVICE CAN BE INSTALLED IN A VEHICLE, CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/ MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
- THE PRODUCT MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES, FOR EXAMPLE, PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
- OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.
- BEFORE MAKING ANY TEST CONNECTIONS, MAKE SURE YOU HAVE SWITCHED OFF ALL EQUIPMENT.

Cautions

- Servicing and alignment must be undertaken by qualified personnel only.
- Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
- Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
- Use only approved components as specified in the parts list.
- Ensure all components, modules, screws and insulators are correctly re-fitted after servicing and alignment.
- Ensure all cables and wires are repositioned correctly.
- Never test a mobile phone WCDMA transmitter with full Tx power, if there is no possibility to perform the measurements in a good performance RF-shielded room. Even low power WCDMA transmitters may disturb nearby WCDMA networks and cause problems to 3G cellular phone communication in a wide area.
- During testing never activate the GSM or WCDMA transmitter without a proper antenna load, otherwise GSM or WCDMA PA may be damaged.

For your safety

QUALIFIED SERVICE

Only qualified personnel may install or repair phone equipment.

ACCESSORIES AND BATTERIES

Use only approved accessories and batteries. Do not connect incompatible products.

CONNECTING TO OTHER DEVICES

When connecting to any other device, read its user’s guide for detailed safety instructions. Do not connect incompatible products.

Care and maintenance

This product is of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfil any warranty obligations and to enjoy this product for many years.

- Keep the phone and all its parts and accessories out of the reach of small children.
- Keep the phone dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the phone in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the phone in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the phone in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- Do not drop, knock or shake the phone. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the phone.
- Do not paint the phone. Paint can clog the moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorised antennas, modifications or attachments could damage the phone and may violate regulations governing radio devices.

All of the above suggestions apply equally to the product, battery, charger or any accessory.

ESD protection

Nokia requires that service points have sufficient ESD protection (against static electricity) when servicing the phone.

Any product of which the covers are removed must be handled with ESD protection. The SIM card can be replaced without ESD protection if the product is otherwise ready for use.

To replace the covers ESD protection must be applied.

All electronic parts of the product are susceptible to ESD. Resistors, too, can be damaged by static electricity discharge.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA).

Every repair action involving opening the product or handling the product components must be done under ESD protection.

ESD protected spare part packages MUST NOT be opened/closed out of an ESD Protected Area.

For more information and local requirements about ESD protection and ESD Protected Area, contact your local Nokia After Market Services representative.

Battery information

Note: A new battery's full performance is achieved only after two or three complete charge and discharge cycles!

The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time (talk-time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

Use only batteries approved by the phone manufacturer and recharge the battery only with the chargers approved by the manufacturer. Unplug the charger when not in use. Do not leave the battery connected to a charger for longer than a week, since overcharging may shorten its lifetime. If left unused a fully charged battery will discharge itself over time.

Temperature extremes can affect the ability of your battery to charge.

For good operation times with Ni-Cd/NiMh batteries, discharge the battery from time to time by leaving the product switched on until it turns itself off (or by using the battery discharge facility of any approved accessory available for the product). Do not attempt to discharge the battery by any other means.

Use the battery only for its intended purpose.

Never use any charger or battery which is damaged.

Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes direct connection of the + and - terminals of the battery (metal strips on the battery) for example when you carry a spare battery in your pocket or purse. Short-circuiting the terminals may damage the battery or the connecting object.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the battery between 15°C and 25°C (59°F and 77°F). A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged. Batteries' performance is particularly limited in temperatures well below freezing.

Do not dispose of batteries in a fire!

Dispose of batteries according to local regulations (e.g. recycling). Do not dispose as household waste.

Company Policy

Our policy is of continuous development; details of all technical modifications will be included with service bulletins.

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If any errors are found by the reader, NOKIA MOBILE PHONES Business Group should be notified in writing/e-mail.

Please state:

- Title of the Document + Issue Number/Date of publication
- Latest Amendment Number (if applicable)
- Page(s) and/or Figure(s) in error

Please send to:

NOKIA CORPORATION
Nokia Mobile Phones Business Group
Nokia Customer Care
PO Box 86
FIN-24101 SALO
Finland
E-mail: Service.Manuals@nokia.com

(This page left intentionally blank.)

Nokia 6126; Nokia 6126h; Nokia 6131; Nokia 6133; Nokia 6133b; Nokia 6133h Service Manual Structure

1 General information
2 Parts and layouts
3 Service Software Instructions
4 Service Tools and Service Concepts
5 Disassembly and reassembly instructions
6 BB Troubleshooting and Manual Tuning Guide
7 RF Troubleshooting and Manual Tuning Guide
8 System module
9 Schematics
Glossary

(This page left intentionally blank.)

1 — General information

(This page left intentionally blank.)

Table of Contents

Product selection....1–5
Features....1–5
  Phone features....1–5
  Software and User interface features....1–6
Accessories....1–8

List of Tables

Table 1 Battery and chargers....1–8
Table 2 Car accessories....1–8
Table 3 Audio....1–9
Table 4 Data....1–9
Table 5 Music....1–10

(This page left intentionally blank.)

Product selection

The RM-115/126 phones are all quadband transceiver units designed for the GSM850/900/1800/1900 networks, including EGSM. Please refer to the table below for an overview of the variants.

Design	Model	Type	BT	FM	IrDA	HAC
	Nokia 6131	RM-115	X	X	X	
	Nokia 6126	RM-126	X			
	Nokia 6126h	RM-126	X			X
	Nokia 6133	RM-115	X	X	X	
	Nokia 6133b	RM-126	X	X		
	Nokia 6133h	RM-126	X	X		X

Features

Phone features

General features

- Demo mode (phone demo without SIM card)
- One-hand push-to-open operation

Display and keypad features

- Main display: Active TFT QVGA display supports up to 16,777,216 colors (320 x 240 pixels, 2.2 inches)
- Outer display: Active TFT display supports up to 262,144 colors (128 x 160 pixels, 1.36 inches)
- Dedicated camera key and volume keys

Hardware features

- Fold phone
- 1.3-megapixel camera with full-screen viewfinder for both main and outer display
- Bluetooth
- PopPortTM™
- 2 mm charger plug interface
- Internal vibrator
- Plug-in SIM (1.8 V and 3.0 V)
- Real time clock
- µSD card
- USB
- FM radio (not all variants)
- IrDA (not all variants)
- HAC (not all variants)

RF features

- Quad-band GSM/EDGE (GSM 850/900/1800/1900)
- Automatic switching between bands
- EDGE (EGPRS): Class 10, download up to 236.8 kbps
- GPRS: (General Packet Radio Service): Class 10, download up to 85.6 kbps

Software and User interface features

Software features

- ISA OS 8.0s Platform
- Nokia Series 40 User interface (UI): Java MIDP 2.0

UI features

Note: These features may vary between the variants.

Imaging	• 1.3-megapixel camera with 8x digital zoom (1280 x 960 pixel resolution) • Full-screen viewfinder for both main and outer display • Camera key for taking pictures • PictBridge printing via USB cable
Multimedia	• MP3 player supporting formats including MP3, MP4, AAC, AAC+, eAAC+, WMA, H.263, H.264 (eAAC+ only playback no streaming) • FM stereo radio with Visual Radio • Video streaming (3GPP) • Video ringing tones • MIDI ringing tones up to 64 polyphonies

Memory functions	• Combo memory with 32 MB flash and 16 MB RAM - about 10 MB user data (10 MB user memory: 9 MB for gallery and applications, 1 MB for contacts, notes, calendar entries) • Hotswap microSD memory card slot supporting up to 2GB microSD memory cards (available as enhancements)
Messaging	• Simplified messaging with recently used contacts log and groups • Email: Access your work and private email accounts; supports SMTP, POP3, and IMAP4 protocols. Support for attachments (Java version) • Xpress audio messaging: Record your own voice message and send to compatible devices • MMS OMA 1.2: Combine image, video, text, and voice clips and send as an MMS to a compatible phone or PC; use MMS to tell your story with a multi-slide presentation. The MMS OMA 1.2 specification allows you to send/ receive messages up to 300 kB in size. • Text messaging: Supports concatenated SMS, picture messaging, SMS distribution list • Predictive text input: Support for all major languages in Europe and Asia-Pacific • Instant Messaging
Applications	• Java™ MIDP 2.0 with over-the-air download of • Java-based applications and games • Wireless presenter (PC application on webpage) • Nokia Sensor application for improved networking • Games: 3D Soccer and Snake
Connectivity	• Nokia PC Suite with USB, Bluetooth and IrDa connectivity • Bluetooth wireless connectivity (SIM access, headset, and handsfree profiles) incl. stereo support for headsets • Pop-Port™ interface with USB • FOTA (Flashing over the air) - dependent on variant • Local/remote SyncML data synchronization
Browsing	• Integrated XHTML browser • Smart content download - OMA Digital rights management 1.0
Data transfer	• EDGE (EGPRS): Class 10, download up to 236.8 kbps • GPRS: (General Packet Radio Service): Class 10, download up to 85.6 kbps **Note:** Actual achieved speeds may vary depending on network support

Voice features	• Push to talk: Select the person or group you want to talk to and press the Push to talk key (long press of volume up key) to communicate • Enhanced voice dialing with SIND: Speaker-independent name dialing on long press volume down key • Integrated handsfree speaker with new high quality speaker for better audio experience (mono) • Voice commands • Voice recorder
Digital services	• User Interface (UI) themes including e.g. animated wallpapers and screensavers, ringing tones • Ringing tones: Video, MP3 ringing tones, True Tones and MIDI ringing, alert, and gaming tones with support of 64 polyphony • OTA download possibility for: Themes, True Tones, MP3 ringing tones, MIDI ringing tones, screensavers, wallpapers, 3GPP streaming, images and videos, Series 40 Java games and applications/li>
Personal information management (PIM)	• Manage your time and information with the enhanced calendar, and view your notes on the new active standby mode • Organizer with calendar, to-do list, notes and calculator/li> • Alarm clock, Countdown timer (normal and interval timer)
Call management	• Speed dialing • Logs: Keeps lists of your dialed, received, and missed calls • Automatic answer (works with headset or car kit only) • Call waiting, call hold, call divert, call timer

Accessories

Table 1 Battery and chargers

Type	Name
Note: This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The 3.5 mm standard charger can be used together with the CA-44 charger adapter.	
AC-3	Compact charger
AC-4	Travel performance charger
BL-4C	Battery 820 mAh Li-Ion
CA-44	Charger adapter (from 3.5 mm -> 2 mm)

Table 2 Car accessories

Type	Name
CK-1W	Wireless car kit
CK-7W	Advanced car kit
DC-4	Mobile charger
HF-6W	Wireless plug-in handsfree

Type	Name
N616	Car kit

Table 3 Audio

Type	Name
AD-15	Audio adapter
AD-42W	Wireless audio gateway
AD-46	Audio adapter
HDA-10	TTY adapter
HDB-4	Boom headset (mono)
HDW-3	Wireless headset
HS-5	Headset
HS-6	Display headset
HS-23	Stereo headset
HS-4W	Wireless boom headset
HS-11W	Wireless headset
HS-12W	Wireless stereo headet
HS-21W	Wireless clip-on headet
HS-25W	Bluetooth headset (= BH-900)
HS-26W	Wireless headset
HS-24W	Bluetooth headset (= BH-200)
HS-36W	Wireless headset
HS-37W	Wireless headset
HS-58W	Wireless headset
LPS-4	Loopset

Table 4 Data

Type	Name
CA-53	USB cable
MU-22	1 GB µSD card
MU-26	128 MB µSD card
MU-27	256 MB µSD card
MU-28	512 MB µSD card

Table 5 Music

Type	Name
MD-1	Music stand

2 — Parts and layouts

(This page left intentionally blank.)

Table of Contents

Exploded view....................2–5
Mechanical parts list....................2–6
SWAP units....................2–8
Parts list....................2–9
Non replaceable parts....................2–20
Component layouts....................2–21

List of Tables

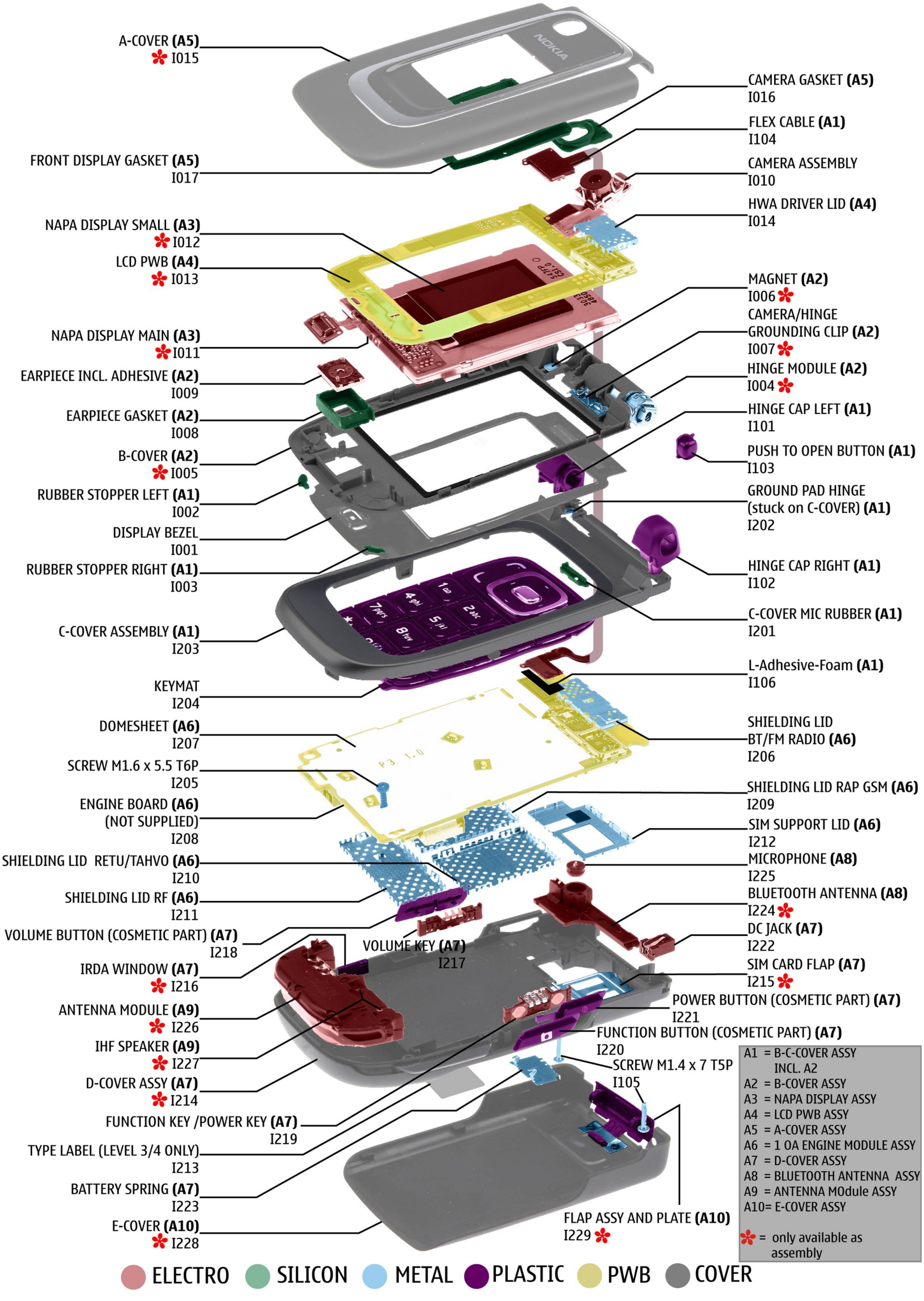
Table 6 Mechanical parts list, all variants....................2–6
Table 7 SWAP phones....................2–8
Table 8 Replaceable component parts, all variants....................2–9

List of Figures

Figure 1 Main board layout, top side (1oaa_50a/1oaa_51a)....................2–22
Figure 2 Main board layout, bottom side (1oaa_50a/1oaa_51a)....................2–22

(This page left intentionally blank.)

Exploded view


A-COVER **(A5)**
✻ I015
FRONT DISPLAY GASKET **(A5)**
I017
NAPA DISPLAY SMALL **(A3)**
✻ I012
LCD PWB **(A4)**
✻ I013
NAPA DISPLAY MAIN **(A3)**
✻ I011
EARPIECE INCL. ADHESIVE **(A2)**
I009
EARPIECE GASKET **(A2)**
I008
B-COVER **(A2)**
✻ I005
RUBBER STOPPER LEFT **(A1)**
I002
DISPLAY BEZEL
I001
RUBBER STOPPER RIGHT **(A1)**
I003
C-COVER ASSEMBLY **(A1)**
I203
KEYMAT
I204
DOMESHEET **(A6)**
I207
SCREW M1.6 x 5.5 T6P
I205
ENGINE BOARD **(A6)**
(NOT SUPPLIED)
I208
SHIELDING LID RETU/TAHVO **(A6)**
I210
SHIELDING LID RF **(A6)**
I211
VOLUME BUTTON (COSMETIC PART) **(A7)**
I218
IRDA WINDOW **(A7)**
✻ I216
ANTENNA MODULE **(A9)**
✻ I226
IHF SPEAKER **(A9)**
✻ I227
D-COVER ASSY **(A7)**
✻ I214
FUNCTION KEY /POWER KEY **(A7)**
I219
TYPE LABEL (LEVEL 3/4 ONLY)
I213
BATTERY SPRING **(A7)**
I223
E-COVER **(A10)**
✻ I228
VOLUME KEY **(A7)**
I217
CAMERA GASKET **(A5)**
I016
FLEX CABLE **(A1)**
I104
CAMERA ASSEMBLY
I010
HWA DRIVER LID **(A4)**
I014
MAGNET **(A2)**
I006 ✻
CAMERA/HINGE
GROUNDING CLIP **(A2)**
I007 ✻
HINGE MODULE **(A2)**
I004 ✻
HINGE CAP LEFT **(A1)**
I101
PUSH TO OPEN BUTTON **(A1)**
I103
GROUND PAD HINGE
(stuck on C-COVER) **(A1)**
I202
HINGE CAP RIGHT **(A1)**
I102
C-COVER MIC RUBBER **(A1)**
I201
L-Adhesive-Foam **(A1)**
I106
SHIELDING LID
BT/FM RADIO **(A6)**
I206
SHIELDING LID RAP GSM **(A6)**
I209
SIM SUPPORT LID **(A6)**
I212
MICROPHONE **(A8)**
I225
BLUETOOTH ANTENNA **(A8)**
I224 ✻
DC JACK **(A7)**
I222
SIM CARD FLAP **(A7)**
I215 ✻
POWER BUTTON (COSMETIC PART) **(A7)**
I221
FUNCTION BUTTON (COSMETIC PART) **(A7)**
I220
SCREW M1.4 x 7 T5P
I105
FLAP ASSY AND PLATE **(A10)**
I229 ✻
● ELECTRO
● SILICON
● METAL
● PLASTIC
● PWB
● COVER

A1 = B-C-COVER ASSY
INCL. A2
A2 = B-COVER ASSY
A3 = NAPA DISPLAY ASSY
A4 = LCD PWB ASSY
A5 = A-COVER ASSY
A6 = 1 OA ENGINE MODULE ASSY
A7 = D-COVER ASSY
A8 = BLUETOOTH ANTENNA ASSY
A9 = ANTENNA MOdule ASSY
A10= E-COVER ASSY

✻ = only available as assembly

Mechanical parts list

Table 6 Mechanical parts list, all variants

ITEM/ CIRCUIT REF.	QTY	PART NAME	COMMENTS
* = Not available as spare part			
I001	1	DISPLAY BEZEL	Must be replaced after disassembly
A1	1	B-C COVER HINGE ASSY (I002-I009;I101-I104;I106;I201-I203)	
I002	1	RUBBER STOPPER LEFT	
I003	1	RUBBER STOPPER RIGHT	
A2	1	B-COVER ASSY(I004-I009)	
I004*	1	HINGE MODULE	
I005*	1	B-COVER	
I006*	1	MAGNET	
I007*	1	CAMERA/HINGE GROUNDING CLIP	
I008	1	EARPIECE GASKET	Must be replaced after disassembly
I009	1	EARPIECE INCL. ADHESIVE	Must be replaced after disassembly
I101	1	HINGE CAP LEFT	
I102	1	HINGE CAP RIGHT	
I103	1	PUSH TO OPEN BUTTON	
I104	1	FLEX CABLE	
I106	1	L-Adhesive-Foam	Must be replaced after disassembly
I201	1	C-COVER MIC RUBBER	
I202	1	GROUND PAD HINGE (stuck on C-COVER)	Must be replaced after disassembly
I203	1	C-COVER ASSEMBLY	
I010	1	CAMERA ASSEMBLY	
I105	2	SCREW M1.4 x 7 T5P	
A3	1	NAPA DISPLAY ASSY (I011-I012)	
I011*	1	NAPA DISPLAY MAIN	
I012*	1	NAPA DISPLAY SMALL	
A4	1	LCD PWB ASSY (I013-I014)	

ITEM/ CIRCUIT REF.	QTY	PART NAME	COMMENTS
I013*	1	LCD PWB	
I014	1	HWA DRIVER LID	Must be replaced after disassembly
A5	1	A-COVER ASSY (I015-I017)	
I015*	1	A-COVER	
I016	1	CAMERA GASKET	
I017	1	FRONT DISPLAY GASKET	
I204	1	KEYMAT	
I205	1	SCREW M1.6 x 5.5 T6P	
A6*	1	10A ENGINE MODULE ASSY(I206-I212)	
I206	1	SHIELDING LID BT/FM RADIO	Must be replaced after disassembly
I207	1	DOMESHEET	Must be replaced after disassembly
I208*	1	ENGINE BOARD	
I209	1	SHIELDING LID RAP GSM	Must be replaced after disassembly
I210	1	SHIELDING LID RETU/Tahvo	Must be replaced after disassembly
I211	1	SHIELDING LID RF	Must be replaced after disassembly
I212	1	SIM SUPPORT LID	Must be replaced after disassembly
I213	1	TYPE LABEL	Must be replaced after disassembly
A7	1	D-COVER ASSY (I214-I223)	
I214*	1	D-COVER ASSY	
I215*	1	SIM CARD FLAP	
I216*	1	IRDA WINDOW	
I217	1	VOLUME KEY	
I218	1	VOLUME BUTTON (COSMETIC PART)	
I219	1	FUNCTION KEY /POWER KEY	
I220	1	FUNCTION BUTTON (COSMETIC PART)	
I221	1	POWER BUTTON (COSMETIC PART)	

ITEM/ CIRCUIT REF.	QTY	PART NAME	COMMENTS
I222	1	DC JACK	
I223	1	BATTERY SPRING	
A8	1	BLUETOOTH ANTENNA ASSEMBLY (I224-I225)	
I224*	1	BLUETOOTH ANTENNA	
I225	1	MICROPHONE	
A9	1	ANTENNA MODULE ASSY (I226-I227)	
I226*	1	ANTENNA MODULE	
I227*	1	IHF SPEAKER	
A10	1	E-COVER ASSY (I228-I229)	
I228*	1	E-COVER	
I229*	1	FLAP ASSY AND PLATE	

SWAP units

Table 7 SWAP phones

SWAP phones
N6131 SWAP TRX RM-115 EURO-I UKR WHITE/RED/SA
N6131 SWAP TRX RM-115 EURO-I RUSS WHITE/RED/SA
N6131 SWAP TRX RM-115 EURO-C SA WHITE/RED/SA
N6131 SWAP TRX RM-115 EURO-C TURK WHITE/RED/SA
N6131 SWAP TRX RM-115 EURO-C FR WHITE/RED/SAND
N6131 SWAP TRX RM-115 EURO-I UKRAINE BLACK
N6131 SWAP TRX RM-115 EURO-I RUSSIA BLACK
N6131 SWAP TRX RM-115 EURO-C SA BLACK
N6131 SWAP TRX RM-115 EURO-C TURKEY BLACK
N6131 SWAP TRX RM-115 EURO-C FRANCE BLACK
N6131 SWAP TRX RM-115 EURO-C BLACK
N6131 SWAP TRX RM-115 EURO-C WHITE/RED/SAND
N6133 RM-115 SWAP E&A silver (Generic)
N6133 RM-115 SWAP FR silver (France)
N6133 RM-115 SWAP TR silver (Turkey)
N6133 RM-115 SWAP RU silver (Russia)
N6133 RM-115 SWAP UA silver (Ukraine)

SWAP phones
N6133 RM-115 SWAP SA silver (South Africa)

Parts list

Table 8 Replaceable component parts, all variants

Item ref	Side	X	Y	Description
B2200	Top	K	8	CRYSTAL 32.768KHZ +/-30PPM 12.5PF
C2000	Top	O	9	CHIPCAP NP0 27P J 50V 0402
C2001	Top	O	9	CHIPCAP X7R 1N0 K 50V 0402
C2002	Top	N	6	CHIPCAP X5R 2U2 K 6V3 0603
C2003	Top	N	6	CHIPCAP X7R 33N K 10V 0402
C2004	Top	N	6	CHIPCAP X7R 33N K 10V 0402
C2005	Top	P	6	CHIPCAP X7R 10N K 16V 0402
C2006	Top	P	6	CHIPCAP X7R 10N K 16V 0402
C2007	Top	N	5	CHIPCAP X7R 10N K 16V 0402
C2008	Top	N	5	CHIPCAP X7R 10N K 16V 0402
C2009	Top	N	6	CHIPCAP X7R 10N K 16V 0402
C2010	Top	N	6	CHIPCAP X7R 10N K 16V 0402
C2011	Top	P	5	CHIPCAP NP0 10P J 50V 0402
C2012	Top	P	5	CHIPCAP NP0 10P J 50V 0402
C2013	Top	P	5	CHIPCAP NP0 10P J 50V 0402
C2014	Top	P	5	CHIPCAP NP0 10P J 50V 0402
C2015	Top	O	6	CHIPCAP X5R 100N K 10V 0402
C2016	Top	O	7	CHIPCAP NP0 270P J 50V 0402
C2017	Top	O	9	CHIPCAP X5R 470N K 25V 0603
C2018	Top	O	7	CHIPCAP X7R 10N K 16V 0402
C2019	Top	P	6	CHIPCAP X7R 10N K 16V 0402
C2070	Top	C	7	CHIPTCAP 150U M 10V 6X3.2X1.5
C2071	Bottom	B	3	CHIPCAP NP0 27P J 50V 0402
C2072	Top	M	9	CHIPCAP NP0 27P J 50V 0402
C2073	Top	D	2	CHIPCAP X5R 1U K 6V3 0603
C2074	Top	D	3	CHIPCAP X7R 10N K 16V 0402
C2075	Top	D	3	CHIPCAP NP0 27P J 50V 0402
C2076	Top	D	7	CHIPCAP X7R 10N K 16V 0402
C2077	Bottom	B	4	CHIPCAP X7R 10N K 16V 0402
C2080	Top	D	5	CHIPCAP NP0 27P J 50V 0402

Item ref	Side	X	Y	Description
C2100	Top	N	6	CHIPCAP X7R 33N K 10V 0402
C2101	Top	N	6	CHIPCAP X7R 33N K 10V 0402
C2102	Top	N	7	CHIPCAP X5R 2U2 K 6V3 0603
C2103	Top	M	6	CHIPCAP X7R 1N0 K 50V 0402
C2104	Top	M	6	CHIPCAP X7R 1N0 K 50V 0402
C2108	Top	C	7	CHIPCAP X7R 1N0 K 50V 0402
C2200	Top	J	6	CHIPCAP X5R 1U K 6V3 0603
C2201	Top	K	8	CHIPCAP X5R 1U K 6V3 0603
C2203	Top	K	7	CHIPCAP X7R 1N0 K 50V 0402
C2204	Top	K	7	CHIPCAP X7R 1N0 K 50V 0402
C2205	Top	K	7	CHIPCAP X7R 1N0 K 50V 0402
C2206	Top	K	7	CHIPCAP X7R 1N0 K 50V 0402
C2207	Top	L	8	CHIPCAP X7R 1N0 K 50V 0402
C2208	Top	L	7	CHIPCAP NP0 27P J 50V 0402
C2209	Top	L	8	CHIPCAP NP0 22P J 50V 0402
C2210	Top	I	8	CHIPCAP X5R 1U K 16V 0603
C2211	Top	I	8	CHIPCAP X5R 4U7 K 10V 0805
C2212	Top	I	7	CHIPCAP X5R 1U5 K 4V 0402
C2213	Top	J	8	CHIPCAP X5R 1U5 K 4V 0402
C2214	Top	J	8	CHIPCAP X5R 1U5 K 4V 0402
C2215	Top	J	9	CHIPCAP X5R 1U5 K 4V 0402
C2216	Top	J	9	CHIPCAP X5R 1U5 K 4V 0402
C2217	Top	K	8	CHIPCAP X5R 1U5 K 4V 0402
C2218	Top	K	7	CHIPCAP X7R 1N0 K 50V 0402
C2219	Top	K	8	CHIPCAP X5R 1U5 K 4V 0402
C2220	Top	I	7	CHIPCAP X5R 1U5 K 4V 0402
C2221	Top	I	9	CHIPCAP X5R 1U K 6V3 0603
C2222	Top	I	8	CHIPCAP X5R 1U K 6V3 0603
C2223	Top	J	6	CHIPCAP X7R 10N K 16V 0402
C2224	Top	K	6	CHIPCAP X7R 10N K 16V 0402
C2225	Top	K	8	CHIPCAP X5R 1U K 6V3 0603
C2226	Top	J	8	CHIPCAP X5R 1U K 6V3 0603
C2227	Top	I	8	CHIPCAP X5R 1U K 6V3 0603
C2228	Top	J	8	CHIPCAP X5R 1U K 6V3 0603
C2229	Top	I	7	CHIPCAP X7R 1N0 K 50V 0402

Item ref	Side	X	Y	Description
C2230	Top	K	8	CHIPCAP X5R 1U K 6V3 0603
C2231	Top	I	6	CHIPCAP X5R 10U M 6V3 0805
C2232	Top	J	8	CHIPCAP X5R 1U K 6V3 0603
C2270	Top	J	6	CHIPCAP X7R 1N0 K 50V 0402
C2271	Top	J	6	CHIPCAP X7R 1N0 K 50V 0402
C2272	Top	J	6	CHIPCAP X7R 1N0 K 50V 0402
C2273	Top	I	7	CHIPCAP X7R 1N0 K 50V 0402
C2274	Top	I	7	CHIPCAP X7R 1N0 K 50V 0402
C2275	Top	I	6	CHIPCAP X7R 1N0 K 50V 0402
C2281	Top	J	9	CHIPCAP X5R 1U K 6V3 0603
C2300	Top	H	7	CHIPCAP X7R 10N K 16V 0402
C2301	Top	G	6	CHIPCAP X5R 22U M 6V3 0805
C2302	Top	I	6	CHIPCAP X5R 22U M 6V3 0805
C2303	Top	G	8	CHIPCAP X5R 1U K 6V3 0603
C2304	Top	I	7	CHIPCAP X7R 10N K 16V 0402
C2305	Top	G	9	CHIPCAP X5R 1U K 6V3 0603
C2306	Top	G	9	CHIPCAP X5R 1U K 6V3 0603
C2307	Top	G	7	CHIPCAP X5R 1U K 6V3 0603
C2309	Top	G	6	CHIPCAP X5R 22U M 6V3 0805
C2312	Top	G	7	CHIPCAP X5R 1U K 6V3 0603
C2313	Top	G	8	CHIPCAP X5R 1U K 6V3 0603
C2314	Top	H	8	CHIPCAP X5R 4U7 K 25V 0805
C2315	Top	I	9	CHIPCAP X5R 4U7 K 25V 0805
C2316	Top	G	9	CHIPCAP NP0 27P J 50V 0402
C2401	Bottom	N	2	CHIPCAP NP0 27P J 50V 0402
C2402	Bottom	P	2	CHIPCAP NP0 27P J 50V 0402
C2403	Bottom	O	4	CHIPCAP NP0 27P J 50V 0402
C2404	Bottom	P	2	CHIPCAP X7R 4N7 K 25V 0402
C2405	Bottom	N	5	CHIPCAP X5R 4U7 K 10V 0805
C2406	Bottom	N	4	CHIPCAP NP0 27P J 50V 0402
C2407	Bottom	N	3	CHIPCAP NP0 27P J 50V 0402
C2408	Bottom	N	4	CHIPCAP X5R 100N K 10V 0402
C2409	Top	D	8	CHIPCAP X7R 4N7 K 25V 0402
C2410	Bottom	N	3	CHIPCAP NP0 27P J 50V 0402
C2420	Bottom	O	3	CHIPCAP X7R 10N K 16V 0402

Item ref	Side	X	Y	Description
C2421	Bottom	O	3	CHIPCAP NP0 27P J 50V 0402
C2422	Bottom	O	5	CHIPCAP NP0 22P J 50V 0402
C2423	Bottom	N	2	CHIPCAP NP0 27P J 50V 0402
C2424	Bottom	O	4	CHIPCAP X5R 100N K 10V 0402
C2431	Bottom	O	5	CHIPCAP NP0 22P J 50V 0402
C2600	Top	E	2	CHIPCAP X5R 4U7 K 6V3 0805
C2601	Top	F	2	CHIPCAP NP0 22P J 50V 0402
C2602	Top	E	2	CHIPCAP X5R 100N K 10V 0402
C2603	Top	E	2	CHIPCAP X5R 100N K 10V 0402
C2604	Top	C	2	CHIPCAP NP0 27P J 50V 0402
C2700	Top	M	9	CHIPCAP X5R 100N K 10V 0402
C2701	Top	M	9	CHIPCAP NP0 27P J 50V 0402
C2800	Top	I	5	CHIPCAP X5R 100N M 16V 0402
C2801	Top	G	5	CHIPCAP X5R 100N M 16V 0402
C2802	Top	H	5	CHIPCAP X5R 100N M 16V 0402
C2803	Top	I	5	CHIPCAP X5R 100N M 16V 0402
C2804	Top	G	5	CHIPCAP X5R 100N M 16V 0402
C2805	Top	J	2	CHIPCAP X5R 100N M 16V 0402
C2807	Top	G	5	CHIPCAP X5R 1U K 6V3 0603
C2808	Top	H	5	CHIPCAP X5R 100N M 16V 0402
C2809	Top	H	5	CHIPCAP X5R 100N M 16V 0402
C2810	Top	I	5	CHIPCAP X5R 100N M 16V 0402
C2811	Top	J	3	CHIPCAP X5R 100N M 16V 0402
C2812	Top	H	5	CHIPCAP X5R 100N M 16V 0402
C2813	Top	G	2	CHIPCAP X5R 100N M 16V 0402
C2814	Top	G	5	CHIPCAP X5R 100N M 16V 0402
C2815	Top	J	5	CHIPCAP X5R 100N M 16V 0402
C2816	Top	J	5	CHIPCAP NP0 27P J 50V 0402
C2818	Top	J	3	CHIPCAP X5R 100N M 16V 0402
C2819	Top	J	4	CHIPCAP X5R 100N M 16V 0402
C2820	Top	G	3	CHIPCAP X5R 100N M 16V 0402
C2821	Top	G	3	CHIPCAP NP0 27P J 50V 0402
C2830	Top	G	4	CHIPCAP X7R 1N0 K 50V 0402
C2831	Top	G	4	CHIPCAP NP0 4P7 C 50V 0402
C3000	Top	L	2	CHIPCAP X5R 100N M 16V 0402

Item ref	Side	X	Y	Description
C3001	Top	K	2	CHIPCAP X7R 10N K 16V 0402
C3002	Top	K	2	CHIPCAP X5R 100N M 16V 0402
C3003	Top	J	5	CHIPCAP X7R 10N K 16V 0402
C3004	Top	J	5	CHIPCAP X5R 100N M 16V 0402
C3005	Top	K	5	CHIPCAP X5R 100N M 16V 0402
C3006	Top	L	5	CHIPCAP X5R 100N M 16V 0402
C3007	Top	K	5	CHIPCAP X7R 10N K 16V 0402
C3008	Top	J	5	CHIPCAP X5R 100N M 16V 0402
C3009	Top	L	5	CHIPCAP X5R 100N M 16V 0402
C3100	Top	L	7	CHIPCAP NP0 27P J 50V 0402
C3200	Top	M	5	CHIPCAP X5R 100N K 10V 0402
C3201	Top	M	5	CHIPCAP X5R 1U K 6V3 0402
C3202	Top	M	6	CHIPCAP X7R 10N K 16V 0402
C3210	Top	M	5	CHIPCAP NP0 27P J 50V 0402
C3242	Top	L	6	CHIPCAP X7R 33N K 10V 0402
C3303	Top	M	5	CHIPCAP X5R 1U K 6V3 0402
C6010	Top	O	8	CHIPCAP NP0 27P J 50V 0402
C6011	Top	O	8	CHIPCAP X7R 10N K 16V 0402
C6012	Top	O	8	CHIPCAP X7R 10N K 16V 0402
C6031	Bottom	N	6	CHIPCAP NP0 18P J 50V 0402
C6032	Bottom	O	7	CHIPCAP NP0 100P J 50V 0402
C6033	Bottom	O	7	CHIPCAP X7R 10N K 16V 0402
C6034	Bottom	O	7	CHIPCAP X7R 10N K 16V 0402
C6035	Bottom	N	7	CHIPCAP X7R 10N K 16V 0402
C6036	Bottom	O	7	CHIPCAP X7R 10N K 16V 0402
C6037	Bottom	O	7	CHIPCAP X5R 1U5 K 4V 0402
C6039	Bottom	O	6	CHIPCAP NP0 18P J 50V 0402
C6040	Bottom	N	7	CHIPCAP X5R 1U K 6V3 0402
C6042	Bottom	N	6	CHIPCAP X7R 10N K 16V 0402
C6051	Bottom	O	6	CHIPCAP NP0 2P7 C 50V 0402
C6052	Bottom	O	6	CHIPCAP NP0 2P7 C 50V 0402
C6055	Bottom	O	6	CHIPCAP X5R 1U K 6V3 0402
C6056	Bottom	O	5	CHIPCAP X5R 4U7 K 6V3 0805
C6157	Bottom	O	9	CHIPCAP X7R 10N K 16V 0402
C6158	Bottom	O	9	CHIPCAP X5R 100N K 10V 0402

Item ref	Side	X	Y	Description
C6162	Bottom	O	9	CHIPCAP X7R 33N K 10V 0402
C6163	Bottom	O	9	CHIPCAP X7R 33N K 10V 0402
C6164	Bottom	N	8	CHIPCAP X5R 100N K 10V 0402
C6165	Bottom	N	8	CHIPCAP X7R 33N K 10V 0402
C6167	Bottom	O	9	CHIPCAP X7R 10N K 16V 0402
C6170	Bottom	O	9	CHIPCAP X7R 10N K 16V 0402
C6176	Bottom	O	8	CHIPCAP NP0 100P J 50V 0402
C6178	Bottom	O	8	CHIPCAP NP0 27P J 50V 0402
C6179	Bottom	O	8	CHIPCAP NP0 47P J 50V 0402
C6188	Bottom	O	8	CHIPCAP X5R 100N K 10V 0402
C6189	Bottom	N	8	CHIPCAP X5R 100N K 10V 0402
C6190	Bottom	N	9	CHIPCAP X5R 100N K 10V 0402
C6191	Bottom	N	9	CHIPCAP X5R 100N K 10V 0402
C7000	Top	C	5	CHIPCAP NP0 10P J 50V 0402
C7001	Top	C	5	CHIPCAP NP0 10P J 50V 0402
C7011	Top	D	5	CHIPCAP NP0 12P J 50V 0402
C7501	Top	F	6	CHIPCAP NP0 2P7 C 50V 0402
C7503	Top	D	7	CHIPCAP X5R 1U K 6V3 0603
C7504	Top	F	6	CHIPCAP X5R 1U K 6V3 0603
C7505	Top	E	7	CHIPCAP X5R 1U K 6V3 0402
C7506	Top	D	7	CHIPCAP X5R 1U K 6V3 0603
C7507	Top	D	7	CHIPCAP X7R 10N K 16V 0402
C7508	Top	D	7	CHIPCAP NP0 18P J 50V 0402
C7509	Top	E	7	CHIPCAP X7R 15N K 16V 0402
C7513	Top	D	7	CHIPCAP X7R 10N K 16V 0402
C7518	Top	D	6	CHIPCAP X5R 100N K 10V 0402
C7520	Top	F	3	CHIPCAP NP0 3P3 C 50V 0402
C7521	Top	F	3	CHIPCAP NP0 1P5 C 50V 0402
C7523	Top	F	3	CHIPCAP X5R 1U K 6V3 0402
C7561	Top	E	7	CHIPCAP X7R 33N K 10V 0402
C7562	Top	D	6	CHIPCAP NP0 39P J 50V 0402
D2200	Top	J	7	RETU 3.02 LF TSA1GJWE TFBGA108
D3000	Top	K	4	COMBO 256M NOR + 128M DDR DRAM FBGA133
F2000	Top	O	9	SM FUSE F 2.0A 32V 0603
G2200	Top	C	8	RTC BACKUP CAPAC 311 SIZE FOR 2.6V 4UAH

Item ref	Side	X	Y	Description
G7501	Top	D	8	VCTCXO 38.4MHZ 2.5V 2MA
L2000	Top	O	9	FERR.BEAD 220R/100M 2A 0R05 0603
L2001	Top	P	5	CHIP BEAD ARRAY 2X1000R 0405
L2002	Top	N	5	CHIP BEAD ARRAY 2X1000R 0405
L2003	Top	N	5	CHIP BEAD ARRAY 2X1000R 0405
L2004	Top	O	6	CHIP COIL 68NH J Q12/100MHZ 0603
L2108	Top	C	6	CHIP COIL 56N J Q38/200MHZ 0603
L2109	Top	C	7	CHIP COIL 56N J Q38/200MHZ 0603
L2202	Top	K	9	FERR.BEAD 220R/100M 2A 0R05 0603
L2203	Top	J	9	FERRITE BEAD 0.6R 600R/100MZ 0402
L2204	Top	K	9	FERRITE BEAD 0.6R 600R/100MZ 0402
L2205	Top	K	9	FERR.BEAD 220R/100M 2A 0R05 0603
L2206	Top	J	9	FERRITE BEAD 0.6R 600R/100MZ 0402
L2270	Top	J	6	FERR.BEAD 220R/100M 2A 0R05 0603
L2271	Top	J	6	FERR.BEAD 220R/100M 2A 0R05 0603
L2272	Top	I	7	FERR.BEAD 220R/100M 2A 0R05 0603
L2273	Top	I	6	FERR.BEAD 220R/100M 2A 0R05 0603
L2301	Top	G	7	FERR.BEAD 220R/100M 2A 0R05 0603
L2302	Top	H	6	INDUCT WW 10U 0A65 0R35 4X4X1.2
L2304	Top	H	8	CHOKE 22U M 0R7 0.35A 3.0X3.0X1.5
L2305	Top	G	8	FERRITE BEAD 0R5 600R/100MHZ 0603
L2306	Top	G	7	FERRITE BEAD 0R5 600R/100MHZ 0603
L2307	Top	H	9	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2400	Bottom	O	5	FERRITE BEAD 0.6R 600R/100MZ 0402
L2403	Bottom	N	5	FERR.BEAD 220R/100M 2A 0R05 0603
L2423	Bottom	O	4	CHIP BEAD ARRAY 2X1000R 0405
L2431	Bottom	N	2	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2432	Bottom	N	3	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2433	Bottom	N	3	FERR.BEAD 240R/100M 0.4A 0R4 0402
L3200	Top	M	5	FERR.BEAD 240R/100M 0.4A 0R4 0402
L3201	Top	M	6	FERR.BEAD 240R/100M 0.4A 0R4 0402
L3202	Top	M	6	FERR.BEAD 240R/100M 0.4A 0R4 0402
L6002	Top	P	2	CHIP COIL 1N8 +-0N3 Q31/800M 0402
L6030	Bottom	O	6	CHIP COIL 2N7 +-0N3 Q29/800M 0402
L6031	Bottom	N	6	CHIP COIL 2N7 +-0N3 Q29/800M 0402

Item ref	Side	X	Y	Description
L6032	Bottom	N	7	CHIP COIL 22N J Q28/800MHZ 0402
L6055	Bottom	O	6	FERR.BEAD 240R/100M 0.4A 0R4 0402
L6156	Bottom	O	9	CHIP COIL 47N G Q38/200MHz 0603
L6176	Bottom	O	8	CHIP COIL 120N J Q32/150MHZ 0603
L7000	Top	D	4	CHIP COIL 18N J Q29/800MHZ 0402
L7001	Top	C	5	CHIP COIL 18N J Q29/800MHZ 0402
L7002	Top	C	5	CHIP COIL 18N J Q29/800MHZ 0402
L7010	Top	F	5	FERR.BEAD 240R/100M 0.4A 0R4 0402
L7011	Top	D	5	FERR.BEAD 240R/100M 0.4A 0R4 0402
L7500	Top	F	5	CHIP COIL 12N J Q31/800MHZ 0402
L7501	Top	F	5	CHIP COIL 12N J Q31/800MHZ 0402
L7502	Top	D	6	FERRITE BEAD 0.6R 600R/100MZ 0402
L7504	Top	E	5	CHIP COIL 22N J Q28/800MHZ 0402
L7505	Top	E	5	CHIP COIL 22N J Q28/800MHZ 0402
M2100	Top	E	9	SMD VIBRA MOTOR 1.3V 90MA 9000RPM
N2300	Top	H	7	TAHVO v5.2 LF TFBGA84
N2301	Top	H	9	WHITE LED DRIVER 4LEDS 500mW 8bump USMD8
N2400	Bottom	O	3	HALL IC SWITCH SH248CSP VCC
N2600	Top	D	2	IRDA CIM-51M5-T 1.152MB/S >2.4V
N3200	Top	M	5	VREG & LEVELSHIFT(LP3928)USMD16
N6030	Bottom	O	7	BC4-ROM1.0RDL
N6156	Bottom	O	8	FM RECEIVER TEA5761UK N4B (Ti) CSP
N7505	Top	E	6	RFIC AHNE400A TRANSCEIVER TFBGA144
N7520	Top	E	3	PA RF9282E6.3 GSM/EDGE 850/900/1800/1900
R2000	Top	O	6	CHIPRES 0W06 220R J 0402
R2001	Top	O	6	ASIP MIC W/ESD RES+CAP+ZDI BGA11
R2002	Top	N	6	CHIPRES 0W06 10R J 0402
R2003	Top	N	5	CHIPRES 0W06 10R J 0402
R2004	Top	N	5	CHIPRES 0W06 10R J 0402
R2005	Top	N	5	CHIPRES 0W06 10R J 0402
R2006	Top	N	5	ASIP 4XESD *** PB-FREE *** BGA5
R2007	Top	O	6	ASIP SILIC USB OTG / ESD BGA11
R2008	Top	O	7	CHIPRES 0W06 220K J 0402
R2009	Top	O	6	CHIPRES 0W06 10K J 0402
R2010	Top	O	7	CHIPRES 0W06 100R J 0402

Item ref	Side	X	Y	Description
R2011	Top	M	7	CHIPRES 0W06 120K J 0402
R2070	Bottom	B	3	CHIP VARISTOR VWM14V VC50V 0402
R2100	Top	N	6	ASIP SINGLE ENDED MICROPHONE INTERF BGA8
R2101	Top	N	6	CHIPRES 0W06 220R J 0402
R2102	Top	M	6	CHIPRES JUMPER 0R0 0402
R2103	Top	M	6	CHIPRES JUMPER 0R0 0402
R2104	Top	F	9	CHIPRES JUMPER 0R0 0402
R2105	Top	F	9	CHIPRES JUMPER 0R0 0402
R2108	Top	F	8	CHIP VARISTOR VWM14V VC50V 0402
R2109	Top	F	8	CHIP VARISTOR VWM14V VC50V 0402
R2114	Top	C	7	CHIP VARISTOR VWM14V VC50V 0402
R2115	Top	C	8	CHIP VARISTOR VWM14V VC50V 0402
R2200	Top	K	9	CHIPRES 0W06 100K J 0402
R2201	Top	L	8	CHIPRES 0W06 120K J 0402
R2202	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2203	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2204	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2205	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2206	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2207	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2208	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2209	Top	K	6	CHIPRES 0W06 1K0 J 0402
R2210	Top	C	8	CHIP VARISTOR VWM14V VC50V 0402
R2212	Top	J	6	CHIPRES 0W06 470R J 0402
R2213	Top	L	8	CHIPRES 0W06 4K7 J 0402
R2214	Top	L	9	CHIPRES 0W06 4K7 J 0402
R2216	Top	L	8	CHIPRES 0W06 2M2 J 0402
R2250	Top	M	9	CHIPRES 0W06 100K J 0402
R2251	Top	M	9	CHIPRES 0W06 100K J 0402
R2307	Top	F	8	CHIPRES 0W06 100R J 0402
R2400	Bottom	I	4	CHIPRES 0W06 470R J 0402
R2401	Bottom	P	2	CHIPRES 0W06 100K J 0402
R2402	Top	D	8	CHIPRES 0W06 33R J 0402
R2403	Bottom	O	2	CHIPRES JUMPER 0R0 0402
R2405	Top	H	2	ASIP SIM INTERFACE **low cap** BGA8

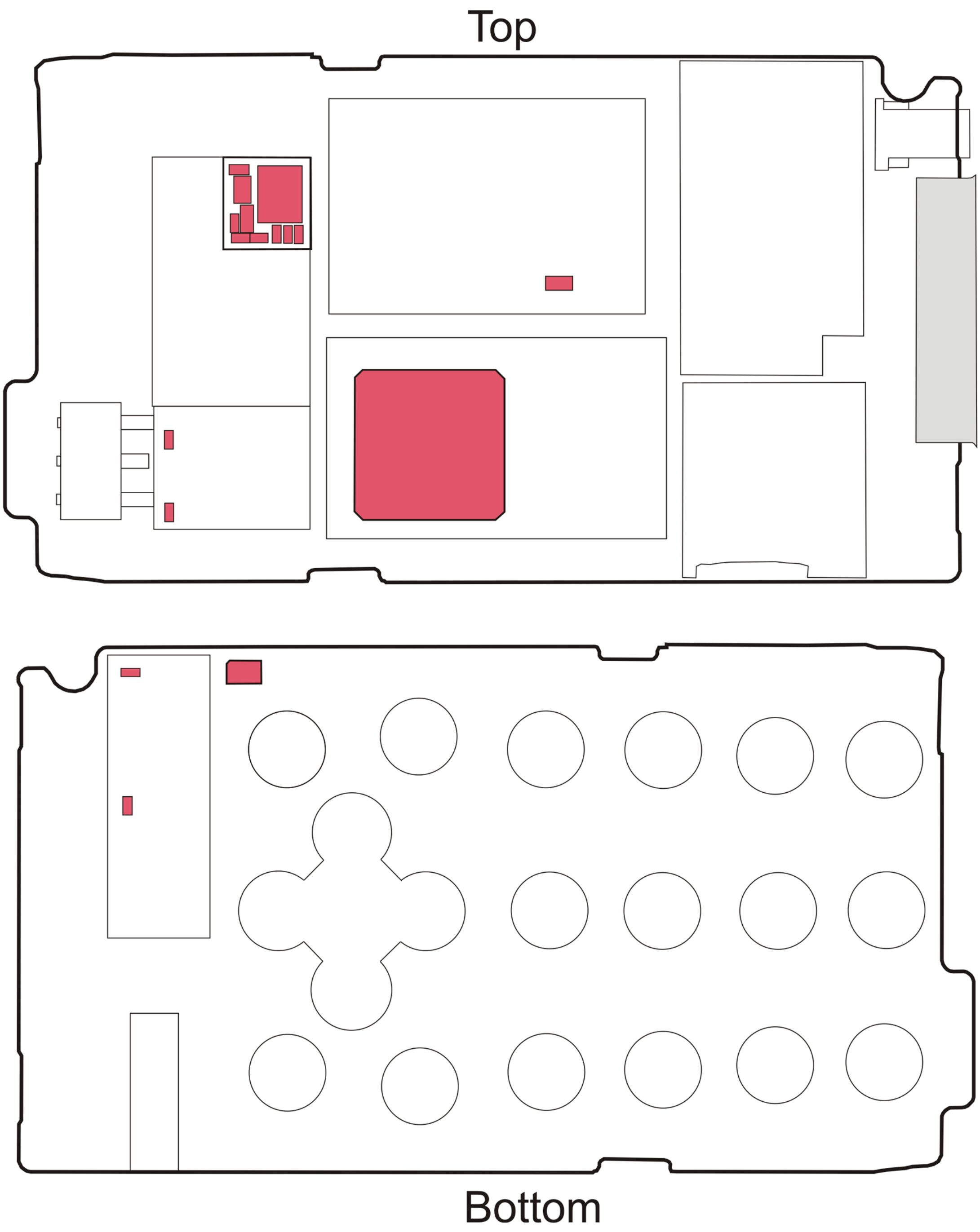
Item ref	Side	X	Y	Description
R2407	Top	D	8	CHIPRES 0W06 47R J 0402
R2408	Top	E	8	CHIPRES 0W06 10K J 0402
R2409	Top	L	9	ASIP SIM INTERFACE **low cap** BGA8
R2410	Bottom	N	3	CHIPRES JUMPER 0R0 0402
R2411	Bottom	O	2	RES NETWORK 0W06 4X33R J 0804
R2412	Bottom	N	3	RES NETWORK 0W06 4X33R J 0804
R2413	Bottom	O	4	RES NETWORK 0W03 4X100R J 0804
R2414	Bottom	P	2	RES NETWORK 0W03 4X100R J 0804
R2417	Top	M	9	NTC RES 0W1 47K J B 4050+-3% 0402
R2420	Bottom	N	2	CHIPRES JUMPER 0R0 0402
R2421	Bottom	P	2	CHIP VARISTOR VWM14V VC50V 0402
R2422	Bottom	O	2	CHIP VARISTOR VWM14V VC50V 0402
R2424	Bottom	I	7	CHIPRES 0W06 470R J 0402
R2425	Top	I	9	CHIPRES 0W06 27R J 0402
R2430	Bottom	N	2	CHIPRES JUMPER 0R0 0402
R2435	Top	L	2	CHIPRES JUMPER 0R0 0402
R2440	Top	L	10	CHIPRES JUMPER 0R0 0402
R2441	Top	L	9	CHIPRES JUMPER 0R0 0402
R2600	Top	F	2	CHIPRES 0W125 4R7 J 0805
R2700	Top	M	8	ASIP SIM INTERFACE **low cap** BGA8
R2801	Top	H	5	CHIPRES 0W06 10R J 0402
R2803	Top	I	5	CHIPRES 0W06 100R J 0402
R2804	Top	I	5	CHIPRES 0W06 100R J 0402
R3000	Top	K	2	CHIPRES 0W06 4K7 J 0402
R3002	Top	I	5	CHIPRES 0W06 10R J 0402
R3003	Top	J	3	CHIPRES 0W06 4K7 J 0402
R3004	Top	J	4	CHIPRES 0W06 4K7 J 0402
R3200	Top	M	5	ASIP MMC FILTER *** PB-FREE ***
R3201	Top	M	6	CHIPRES 0W06 22K J 0402
R3202	Top	M	6	CHIPRES 0W06 22K J 0402
R3242	Top	L	6	CHIPRES 0W06 100K J 0402
R3243	Top	L	6	CHIPRES 0W06 4K7 J 0402
R3312	Top	L	5	CHIPRES 0W06 1K0 J 0402
R3313	Top	L	5	CHIPRES 0W06 1K0 J 0402
R3314	Bottom	N	3	CHIPRES JUMPER 0R0 0402

Item ref	Side	X	Y	Description
R6010	Top	O	8	CHIPRES 0W06 330R J 0402
R6011	Top	O	7	CHIPRES 0W06 27K J 0402
R6013	Top	O	7	CHIPRES 0W06 1K2 J 0402
R6014	Top	O	8	CHIPRES 0W06 2K2 J 0402
R6015	Top	O	7	CHIPRES JUMPER 0R0 0402
R6030	Bottom	O	7	CHIPRES 0W06 10K J 0402
R6031	Bottom	N	6	CHIPRES 0W06 10K J 0402
R6032	Bottom	N	7	CHIPRES 0W06 2R2 J 0402
R6034	Bottom	O	6	CHIPRES 0W06 10K J 0402
R6036	Bottom	O	5	CHIPRES JUMPER 0R0 0402
R6040	Bottom	O	5	CHIPRES 0W06 100K J 0402
R6156	Bottom	N	9	CHIPRES JUMPER 0R0 0402
R6159	Bottom	O	9	CHIPRES 0W06 10K J 0402
R6160	Bottom	O	9	CHIPRES 0W06 100K J 0402
R6161	Bottom	O	8	CHIPRES JUMPER 0R0 0402
R7502	Top	F	6	CHIPRES 0W06 10K F 0402
R7503	Top	D	6	CHIPRES 0W06 4K7 J 0402
R7506	Top	E	7	CHIPRES 0W06 15R J 0402
R7507	Top	F	6	CHIPRES 0W06 10R J 0402
R7508	Top	E	7	CHIPRES 0W06 10R J 0402
R7509	Top	D	7	CHIPRES 0W06 22K J 0402
R7510	Top	D	3	CHIPRES 0W06 15R J 0402
R7522	Top	D	3	CHIPRES 0W06 27K J 0402
R7523	Top	F	3	CHIPRES JUMPER 0R0 0402
T7520	Top	F	3	TRANSF BALUN 1800+-100MHZ 2X1.25
V2000	Top	O	9	ASIP TVS BGA4
V2302	Top	F	9	SCH DI 20V 2A SOD323F
V2400	Bottom	C	7	LED WHITE 140MCD 5MA 0603
V2401	Top	E	9	TRX2 BIPOLAR 2XPNP 40V 0A1 0W12 SOT666
V2402	Top	E	9	TR NPN RBE4K7/47K 50V 0A08 VMT3
V2405	Bottom	I	7	LED WHITE 140MCD 5MA 0603
V2411	Bottom	C	4	LED WHITE 140MCD 5MA 0603
V2412	Bottom	I	4	LED WHITE 140MCD 5MA 0603
V6010	Top	O	8	TR BFR93AW N 12V 35MA 5GHZ SOT323
X2001	Top	P	6	CONN SYST SM 14POL

Item ref	Side	X	Y	Description
X2070	Top	C	3	SM LYNX BATT.CONN 3POL HEIGHT 7.3
X2402	Bottom	O	3	CONN BTB 2X25F P0.4 30V 0.3A
X2700	Top	N	8	SM SIM CONN 6POL P2.54 H1.5
X3200	Top	N	3	CONN SMC TRANSFLASH MMC
Z2000	Top	P	6	FERRITE BEAD 0.6R 600R/100MZ 0402
Z2001	Top	P	6	FERRITE BEAD 0.6R 600R/100MZ 0402
Z2003	Top	P	7	FERRITE BEAD 0.6R 600R/100MZ 0402
Z2400	Bottom	N	4	ASIP 10-CH ESD EMI FILTER BGA25
Z2401	Bottom	N	2	ASIP 10-CH ESD EMI FILTER BGA25
Z6030	Bottom	O	6	LTCC FILT 2441.75+-41.75MHZ 2.5X2
Z7501	Top	F	4	DUAL RX SAW FILTER 1800/1900 MHz 2016
Z7503	Top	E	5	TX SAW MODULE GSM 850/900MHz 4.5x3.2
Z7504	Top	E	4	DUAL RX SAW FILTER 850/900 MHz 2016
Z7520	Top	F	4	FERRITE BEAD 0R01 28R/100MHZ 0603

Non replaceable parts

The parts marked in the picture below must not be replaced. If the problem is located to one of these components, please swap the PWB.



VCO
G7500 VCO
C7515
C7516
C7511
C7560
C7564
L7515
R7501
R7505
T7501

Other
C7524
C7525
C2202
C6032
R6159

D2800 RAPGSM

X2060 ID

Component layouts

Note: See also large scale layouts in the Schematics section.

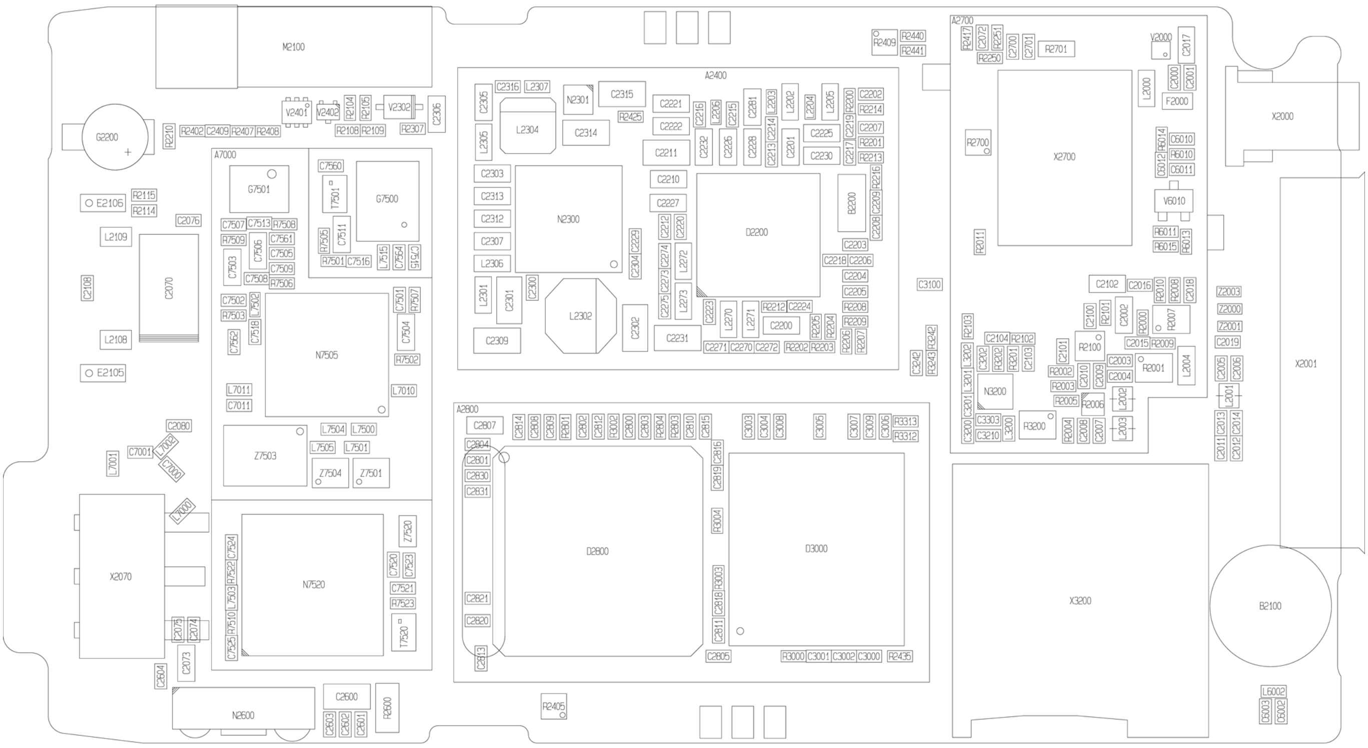

M2100
G2200
A7000
G7501
G7500
N7505
Z7503
Z7504
Z7501
N7520
X2070
N2600
A2400
N2301
L2304
C2314
N2300
L2302
D2200
A2800
D2800
D3000
A2700
X2700
X2000
X2001
X3200
N3200
B2100

Figure 1 Main board layout, top side (1oaa_50a/1oaa_51a)

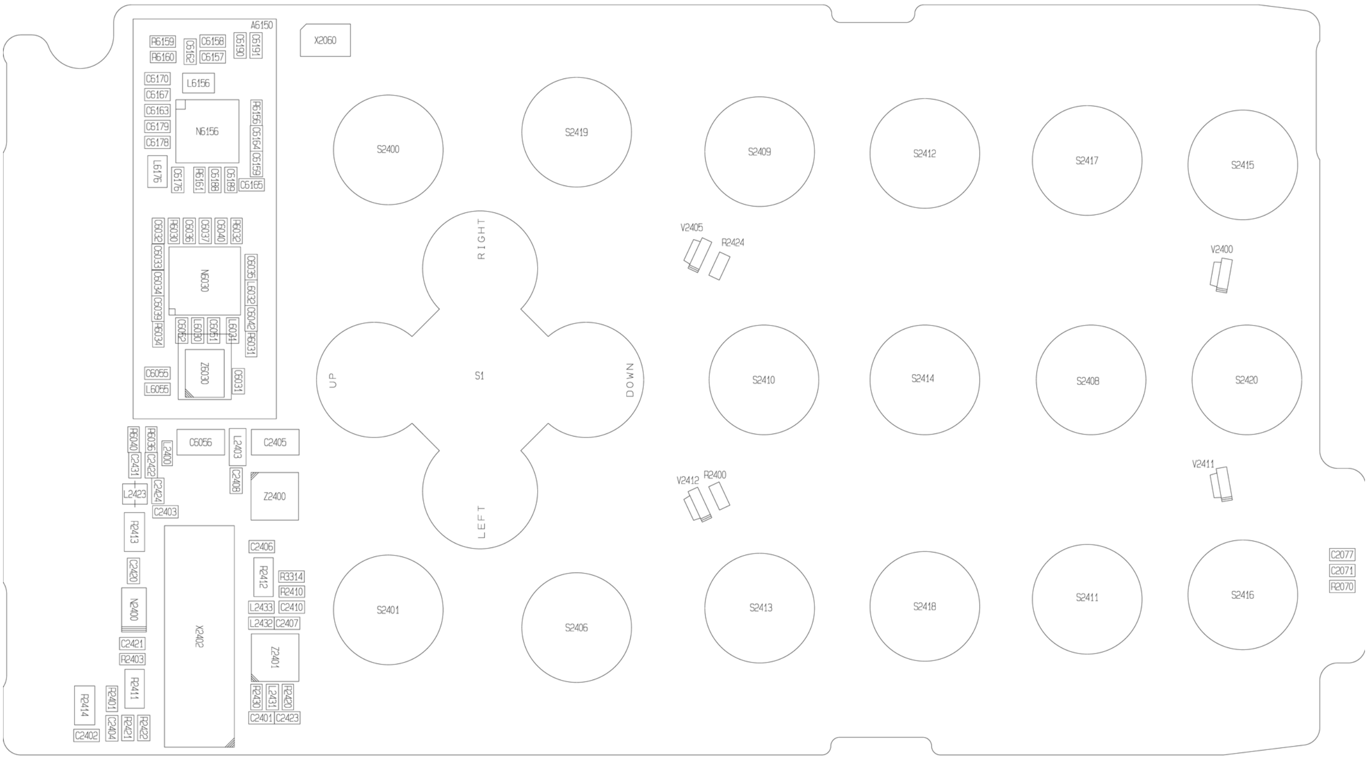

A6150
X2060
N6156
N6030
Z6030
S2400
S2419
S2409
S2412
S2417
S2415
RIGHT
UP
S1
DOWN
LEFT
V2405
R2424
V2400
S2410
S2414
S2408
S2420
V2412
R2400
V2411
S2401
S2406
S2413
S2418
S2411
S2416
Z2400
X2402
N2400
Z2401

Figure 2 Main board layout, bottom side (1oaa_50a/1oaa_51a)

3 — Service Software Instructions

(This page left intentionally blank.)

Table of Contents

Phoenix installation steps in brief....3–5
Installing Phoenix....3–6
Updating Phoenix installation....3–8
Uninstalling Phoenix....3–9
Repairing Phoenix installation....3–11
Phone data package overview....3–11
Installing phone data package....3–12
Uninstalling phone data package....3–15
Configuring users in Phoenix....3–17
Managing connections in Phoenix....3–17
Installing flash support files for FPS-8 and FPS-10....3–19
Updating FPS-8 and FPS-10 flash prommer software....3–22
Activating FPS-8....3–23
Deactivating FPS-8....3–24

List of Figures

Figure 3 Dongle not found....3–6
Figure 4 Disclaimer text....3–7
Figure 5 InstallShield Wizard Complete....3–8
Figure 6 Installation interrupted....3–9
Figure 7 Remove program....3–10
Figure 8 Finish uninstallation....3–10
Figure 9 Repair program....3–11
Figure 10 Data package setup information....3–13
Figure 11 Data package destination folder....3–14
Figure 12 InstallShield Wizard Complete....3–15
Figure 13 Uninstalling phone data package....3–16
Figure 14 Finishing data package uninstallation....3–16
Figure 15 Phoenix login....3–17
Figure 16 New user configured....3–17
Figure 17 Select mode: Manual....3–18
Figure 18 Connections list....3–19
Figure 19 Connection information....3–19
Figure 20 Product support module information (example from RM-1)....3–19
Figure 21 Flash update welcome dialog....3–20
Figure 22 Flash installation interrupted....3–20
Figure 23 Flash destination folder....3–21
Figure 24 Finish flash update....3–22
Figure 25 Flash directory window....3–22
Figure 26 Prommer software update finished....3–23
Figure 27 Prommer Maintenance window....3–23
Figure 28 Box activation....3–24
Figure 29 Deactivation warning....3–24

(This page left intentionally blank.)

Phoenix installation steps in brief

Before you begin

Recommended hardware requirements:

- Computer processor: Pentium 700 MHz or higher
- RAM 256 MB
- Disk space 100-300 MB

Supported operating systems:

- *Windows 2000* Service Pack 3 or higher
- *Windows XP* Service Pack 1 or higher

Context

Phoenix is a service software for reprogramming, testing and tuning phones.

Phoenix installation contains:

- Service software support for all phone models included in the package
- Flash update package files for programming devices
- All needed drivers for:
  - PKD-1 (DK2) dongle
  - DKU-2 USB cable

> **Note:** Separate installation packages for flash update files and drivers are also available, but it is not necessary to use them unless there are updates between *Phoenix* service software releases. If separate update packages are used, they should be used after *Phoenix* and data packages have been installed.

The phone model specific data package includes all changing product specific data:

- Product software binary files
- Files for type label printing
- Validation file for the faultlog repair data reporting system
- All product specific configuration files for *Phoenix* software components

> **Note:** *Phoenix* and phone data packages should only be used as complete installation packages. Uninstallation should be made from the *Windows* Control Panel.

To use *Phoenix*, you need to:

Steps

1. Connect a PKD-1 (DK2) dongle to the computer parallel port.
2. Install *Phoenix*.
3. Install the phone-specific data package.
4. Configure users.
5. Manage connection settings (depends on the tools you are using).

If you use FPS-8:	• Update FPS-8 software • Activate FPS-8

If you use FPS-10:	• Update FPS-10 software **Note:** There is no need to activate FPS-10. • Activate SX-4 smart card, if you need tuning and testing functions. **Note:** When FPS-10 is used only for product software updates, SX-4 smart card is not needed.

Results

Phoenix is ready to be used with FPS-8 or FPS-10 flash prommers and other service tools.

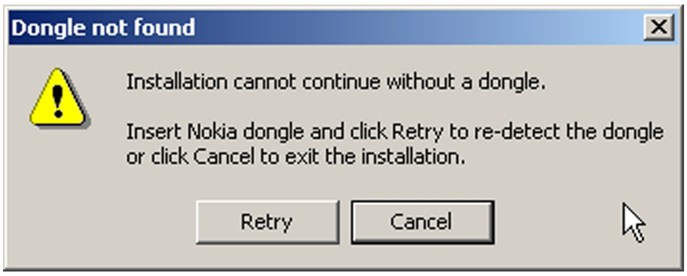
Installing *Phoenix*

Before you begin

- Check that a dongle is attached to the parallel port of your computer.
- Download the *Phoenix* installation package (for example, *phoenix_service_sw_2004_39_x_xx.exe*) to your computer (in *C:|TEMP*, for instance).
- Close all other programs.
- Depending on your operating system, administrator rights may be required to install *Phoenix*.
- If uninstalling or rebooting is needed at any point, you will be prompted by the InstallShield program.

Context

At some point during the installation procedure, you may get the following message:



Dongle not found

Installation cannot continue without a dongle.

Insert Nokia dongle and click Retry to re-detect the dongle or click Cancel to exit the installation.

Figure 3 Dongle not found

This may be a result of a defective or too old PKD-1 dongle.

Check the COM/parallel ports used. After correcting the problem, you can restart the installation.

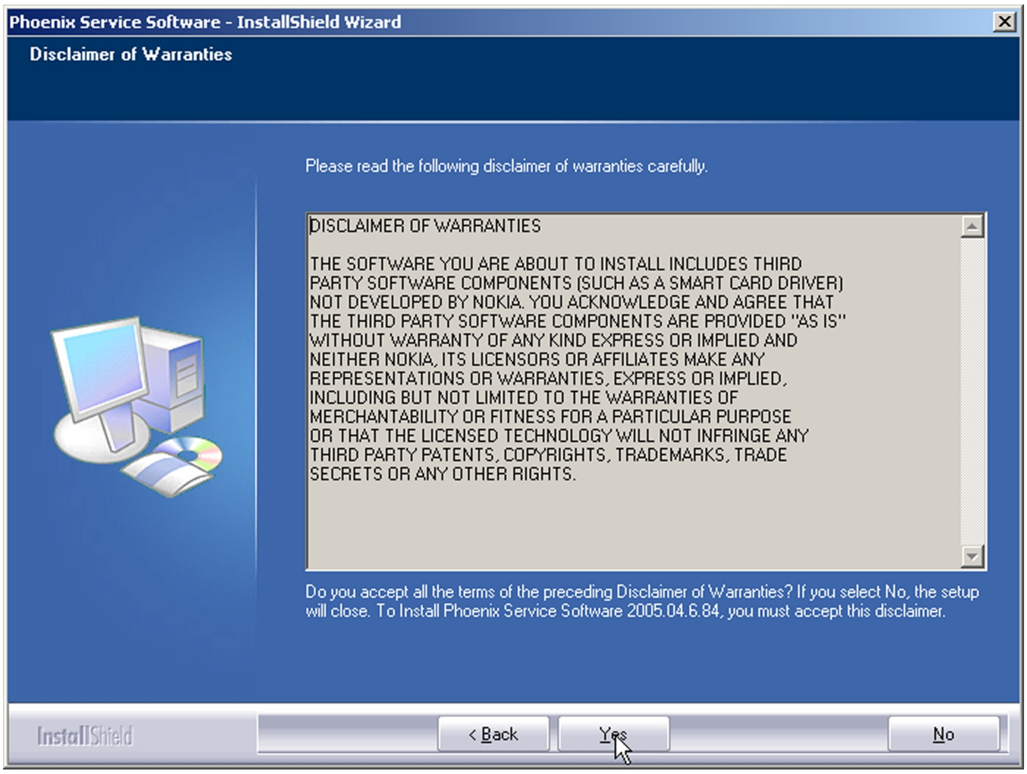
For more detailed information, please refer to *Phoenix* Help files.

> **Tip:** Each feature in *Phoenix* has its own Help function, which can be activated while running the program. Press the **F1** key or the feature's **Help** button to activate a Help file.

Steps

1. To start the installation, run the application file (for example,*phoenix_service_sw_2004_39_x_xx.exe*).
2. In the *Welcome* dialogue, click **Next**.

3. Read the disclaimer text carefully and click **Yes**.



Please read the following disclaimer of warranties carefully.

DISCLAIMER OF WARRANTIES

THE SOFTWARE YOU ARE ABOUT TO INSTALL INCLUDES THIRD PARTY SOFTWARE COMPONENTS (SUCH AS A SMART CARD DRIVER) NOT DEVELOPED BY NOKIA. YOU ACKNOWLEDGE AND AGREE THAT THE THIRD PARTY SOFTWARE COMPONENTS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND EXPRESS OR IMPLIED AND NEITHER NOKIA, ITS LICENSORS OR AFFILIATES MAKE ANY REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR THAT THE LICENSED TECHNOLOGY WILL NOT INFRINGE ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADEMARKS, TRADE SECRETS OR ANY OTHER RIGHTS.

Do you accept all the terms of the preceding Disclaimer of Warranties? If you select No, the setup will close. To Install Phoenix Service Software 2005.04.6.84, you must accept this disclaimer.

Figure 4 Disclaimer text

4. Choose the destination folder.

   The default folder *C:|ProgramFiles|Nokia|Phoenix* is recommended.
5. To continue, click **Next.**

   To choose another location, click **Browse** (not recommended).
6. Wait for the components to be copied.

   The progress of the installation is shown in the *Setup Status* window.
7. Wait for the drivers to be installed and updated.

   The process may take several minutes to complete.

   If the operating system does not require rebooting, the PC components are registered right away.

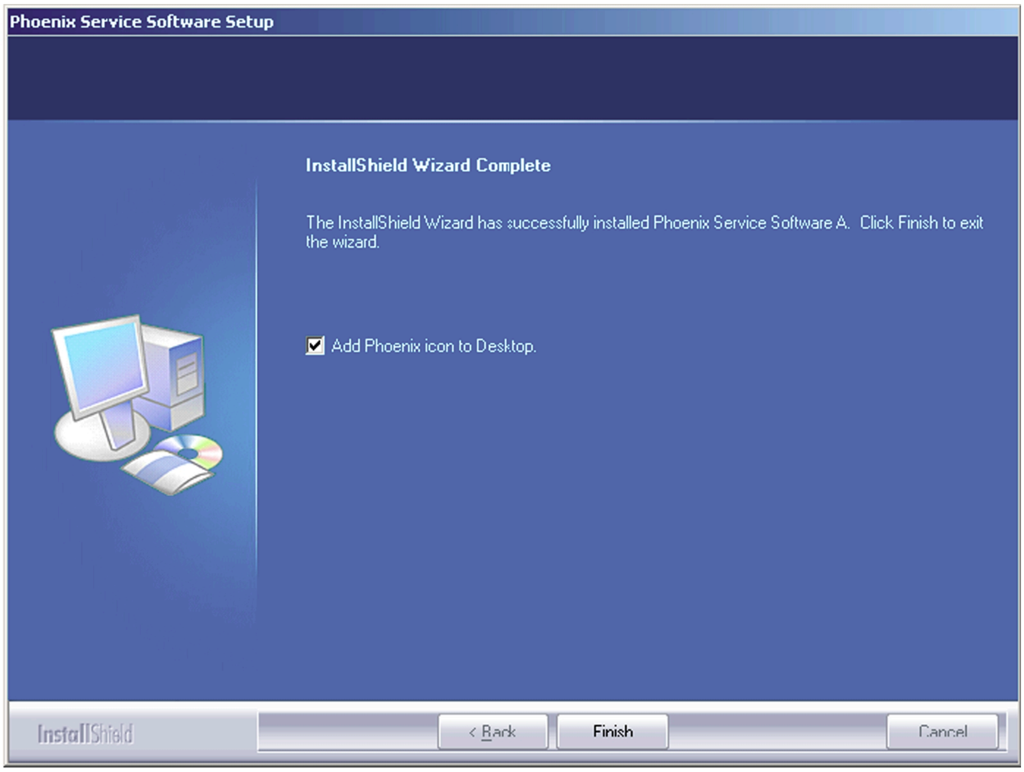
   If the operating system requires restarting your computer, the Install Shield Wizard will notifies about it.

   Select **Yes...** to reboot the PC immediately or **No...** to reboot the PC manually afterwards.

   After the reboot, all components are registered.

   Note: *Phoenix* does not work, if the components have not been registered.

8. To end the installation, click **Finish**.



Phoenix Service Software Setup

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed Phoenix Service Software A. Click Finish to exit the wizard.

☑ Add Phoenix icon to Desktop.

Figure 5 InstallShield Wizard Complete

Next action

After the installation, *Phoenix* can be used after:

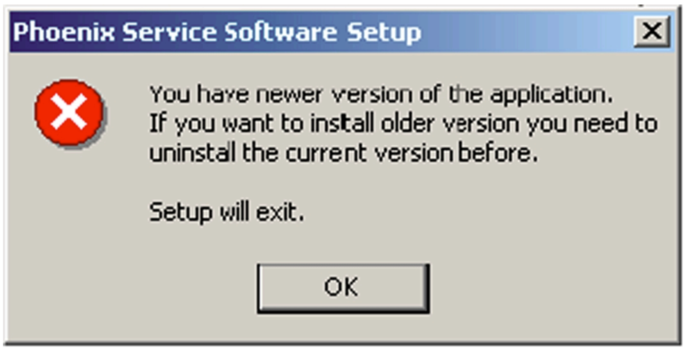
- installing phone model specific data package for *Phoenix*
- configuring users and connections

FPS-8 and FPS-10 flash prommers can be used after updating their flash update package files.

Updating *Phoenix* installation

Context

- If you already have the *Phoenix* service software installed on your computer, you need to update the software when new versions are released.
- To update *Phoenix*, you need to follow the same steps as when installing it for the first time.
- When you are updating, for example, from version **a14_2004_16_4_47** to **a15_2004_24_7_55**, the update will take place automatically without uninstallation.
- Always use the latest available versions of both *Phoenix* and the phone-specific data package. Instructions can be found in the phone model specific Technical Bulletins and phone data package *readme.txt* files (shown during installation).
- If you try to update *Phoenix* with the same version you already have (for example, **a15_2004_24_7_55** to **a15_2004_24_7_55**), you are asked if you want to uninstall the existing version. In this case you can choose between a total uninstallation or a repair installation in a similar way when choosing to uninstall the application from the *Windows* Control Panel.
- If you try to install an older version (for example, downgrade from **a15_2004_24_7_55** to **a14_2004_16_4_47**), installation will be interrupted.


Phoenix Service Software Setup

You have newer version of the application.
If you want to install older version you need to uninstall the current version before.

Setup will exit.

Figure 6 Installation interrupted

- Always follow the instructions on the screen.

Steps

1. Download the installation package to your computer hard disk.
2. Close all other programs.
3. Run the application file (for example, *phoenix_service_sw_2004_39_x_xx.exe*).

Results

A new *Phoenix* version is installed and driver versions are checked and updated.

Uninstalling *Phoenix*

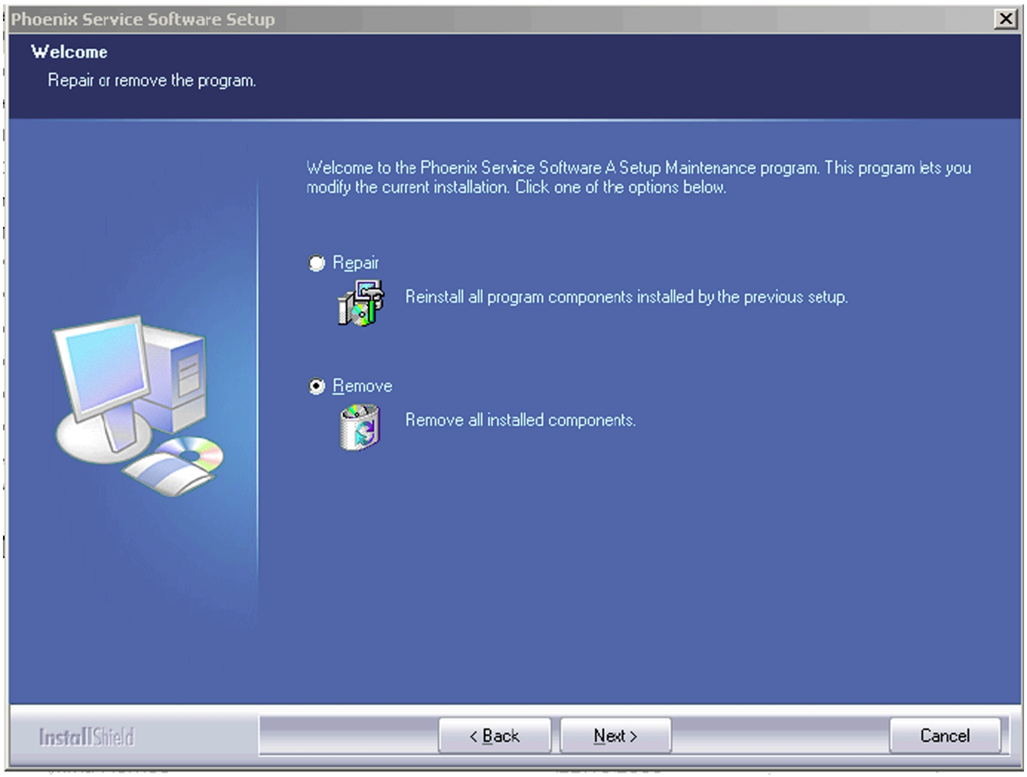
Context

You can uninstall *Phoenix* service software manually from the *Windows* Control Panel.

Steps

1. Open the **Windows Control Panel**, and choose **Add/Remove Programs**.

2. To uninstall *Phoenix*, choose **Phoenix Service Software→Change/Remove→Remove** .

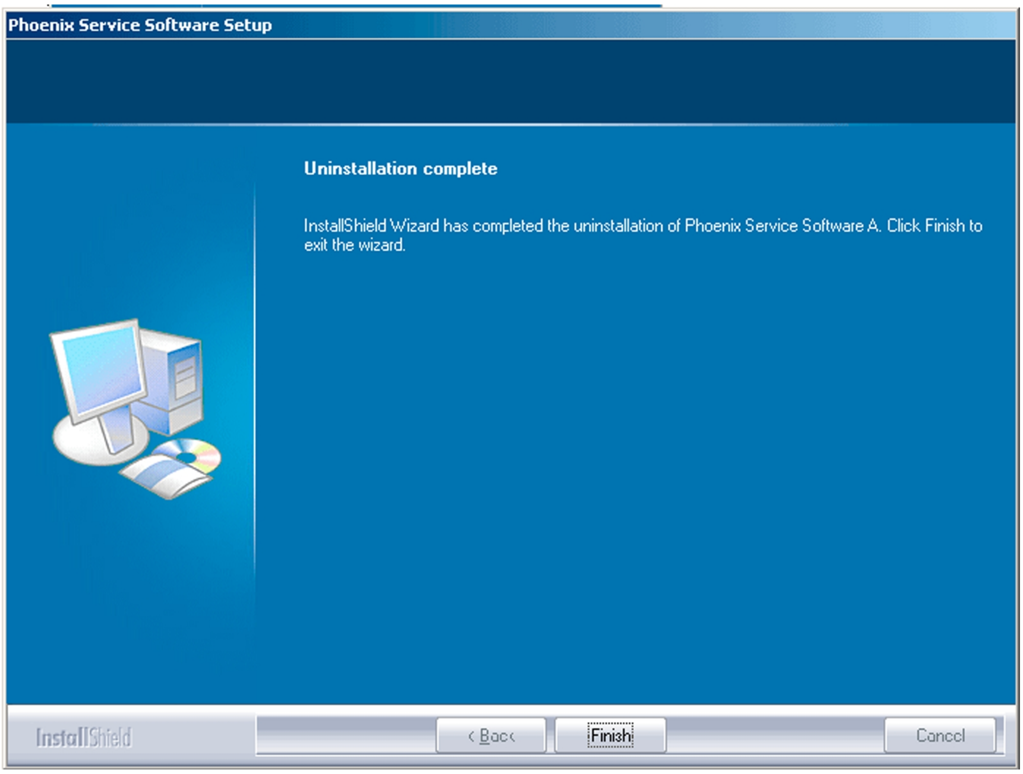


Phoenix Service Software Setup
Welcome
Repair or remove the program.
Welcome to the Phoenix Service Software A Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.
○ Repair
Reinstall all program components installed by the previous setup.
● Remove
Remove all installed components.
InstallShield
< Back
Next >
Cancel

Figure 7 Remove program

The progress of the uninstallation is shown.

3. If the operating system does not require rebooting, click **Finish** to complete.



Phoenix Service Software Setup
Uninstallation complete
InstallShield Wizard has completed the uninstallation of Phoenix Service Software A. Click Finish to exit the wizard.
InstallShield
< Back
Finish
Cancel

Figure 8 Finish uninstallation

If the operating system requires rebooting, InstallShield Wizard will notify you. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

Repairing *Phoenix* installation

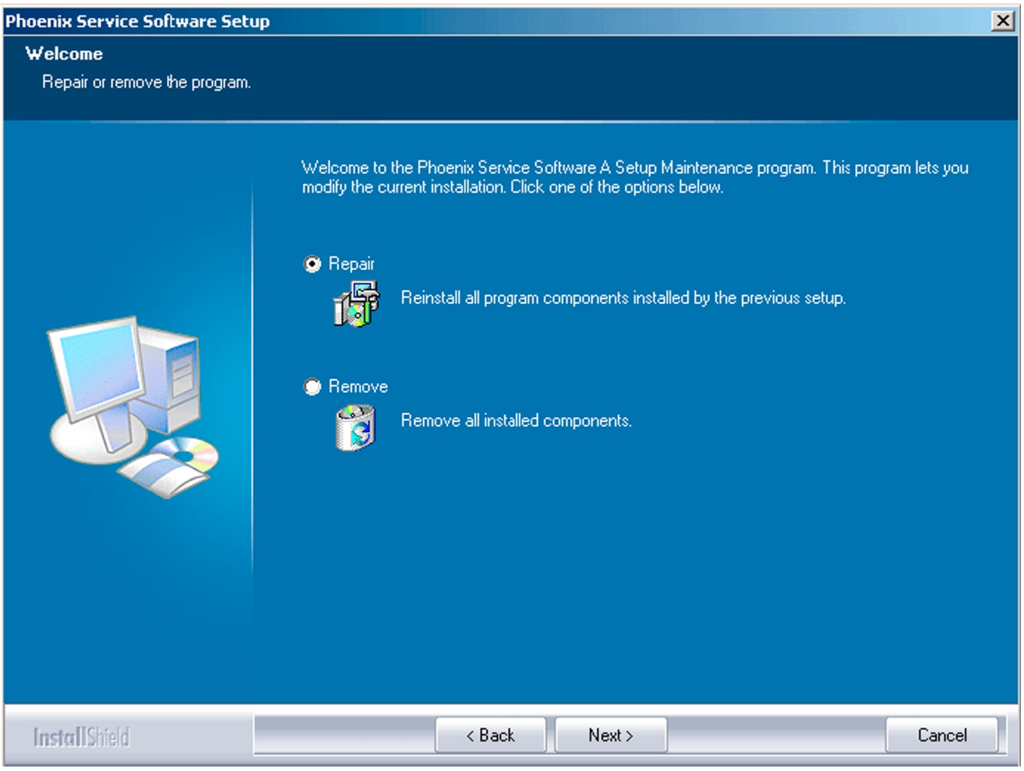
Context

If you experience any problems with the service software or suspect that files have been lost, use the repair function before completely reinstalling *Phoenix*.

> **Note:** The original installation package (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) must be found on your PC when you run the repair setup.

Steps

1. Open **Windows Control Panel→Add/Remove Programs** .
2. Choose **Phoenix Service Software→Change/Remove** .
3. In the following view, select **Repair**.



Phoenix Service Software Setup

Welcome

Repair or remove the program.

Welcome to the Phoenix Service Software A Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.

● Repair

Reinstall all program components installed by the previous setup.

○ Remove

Remove all installed components.

Figure 9 Repair program

   Phoenix reinstalls components and registers them.

   The procedure is the same as when updating *Phoenix*.

4. To complete the repair, click **Finish**.

Phone data package overview

Each product has its own data package (DP). The product data package contains all product-specific data files to make the Phoenix service software and tools usable with a certain phone model.

The phone data package contains the following:

- Product software binary files

- Files for type label printing
- Validation file for the fault log repair data reporting system
- All product-specific configuration files for Phoenix software components

Data files are stored in **C:\Program Files\Nokia\Phoenix** (default).

Installing phone data package

Before you begin

- A phone-specific data package contains all data required for the *Phoenix* service software and service tools to be used with a certain phone model.
- Check that a dongle is attached to the parallel port of your computer.
- Install *Phoenix* service software.
- Download the installation package (for example, *XX-XX_dp_EA_v_1_0.exe*) to your computer (for example, in C:\TEMP).
- Close all other programs.

(XX-XX = type designator of the product)

If you already have *Phoenix* installed on your computer, you will need to update it when a new version is released.

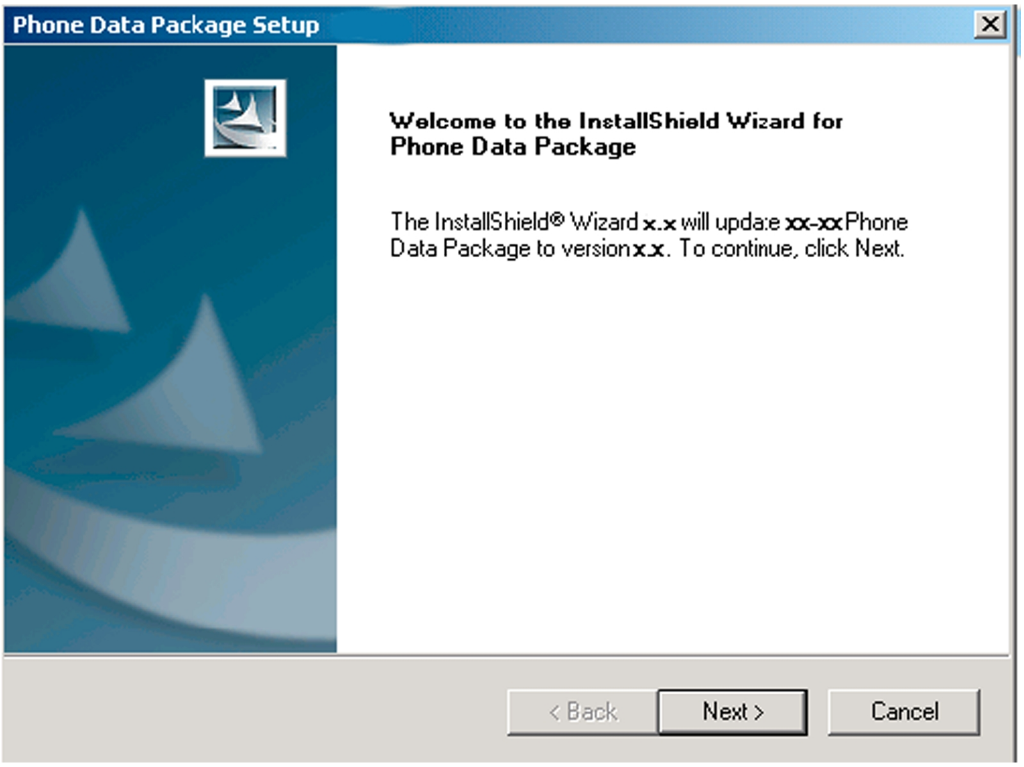
> **Note:** Often *Phoenix* and the phone-specific data package come in pairs, meaning that a certain version of *Phoenix* can only be used with a certain version of a data package. Always use the latest available versions of both. Instructions can be found in phone-specific Technical Bulletins and *readme.txt* files of data packages.

Steps

1. To start the installation, run the application file (for example, *XX-XX_dp_EA_ v_1_0.exe*),

   Wait for the installation files to be extracted.

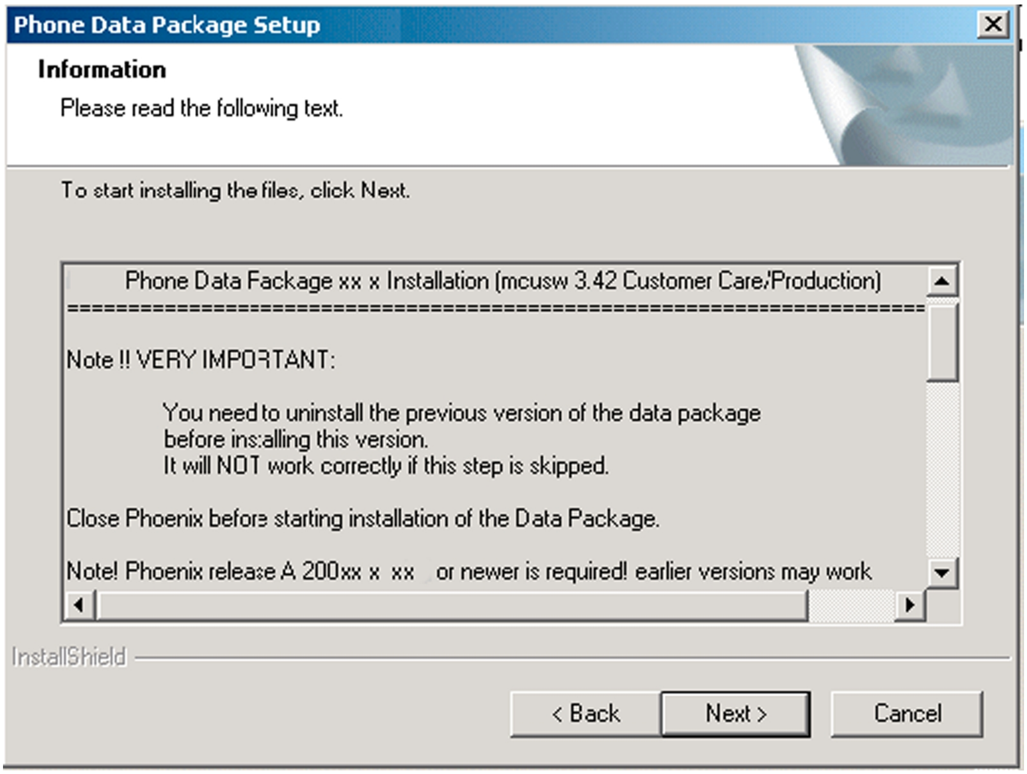
2. Click **Next**.



Welcome to the InstallShield Wizard for Phone Data Package

The InstallShield® Wizard x.x will update xx-xx Phone Data Package to version x.x. To continue, click Next.

3. In the following view you can see the contents of the data package. Read the text carefully. There is information about the *Phoenix* version required with this data package.



Information

Please read the following text.

To start installing the files, click Next.

Phone Data Package xx x Installation (mcusw 3.42 Customer Care/Production)
==

Note !! VERY IMPORTANT:

You need to uninstall the previous version of the data package
before installing this version.
It will NOT work correctly if this step is skipped.

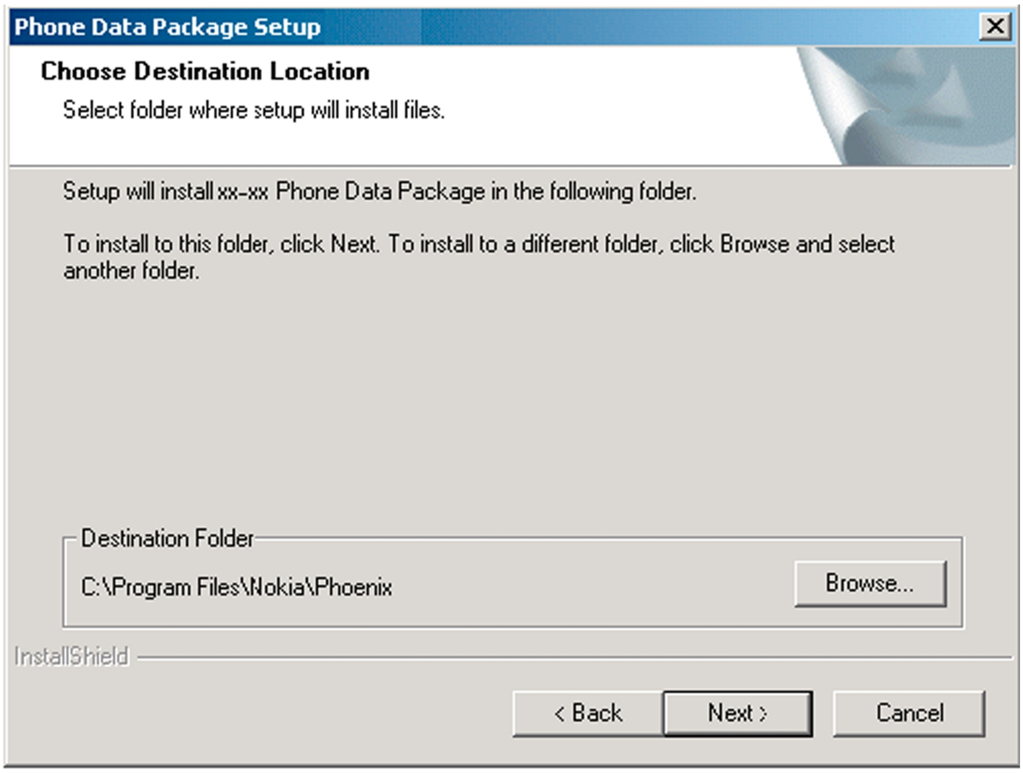
Close Phoenix before starting installation of the Data Package.

Note! Phoenix release A 200xx x xx or newer is required! earlier versions may work

Figure 10 Data package setup information

4. To continue, click **Next**.

5. Choose the destination folder, and click **Next** to continue.



Phone Data Package Setup

Choose Destination Location

Select folder where setup will install files.

Setup will install xx-xx Phone Data Package in the following folder.

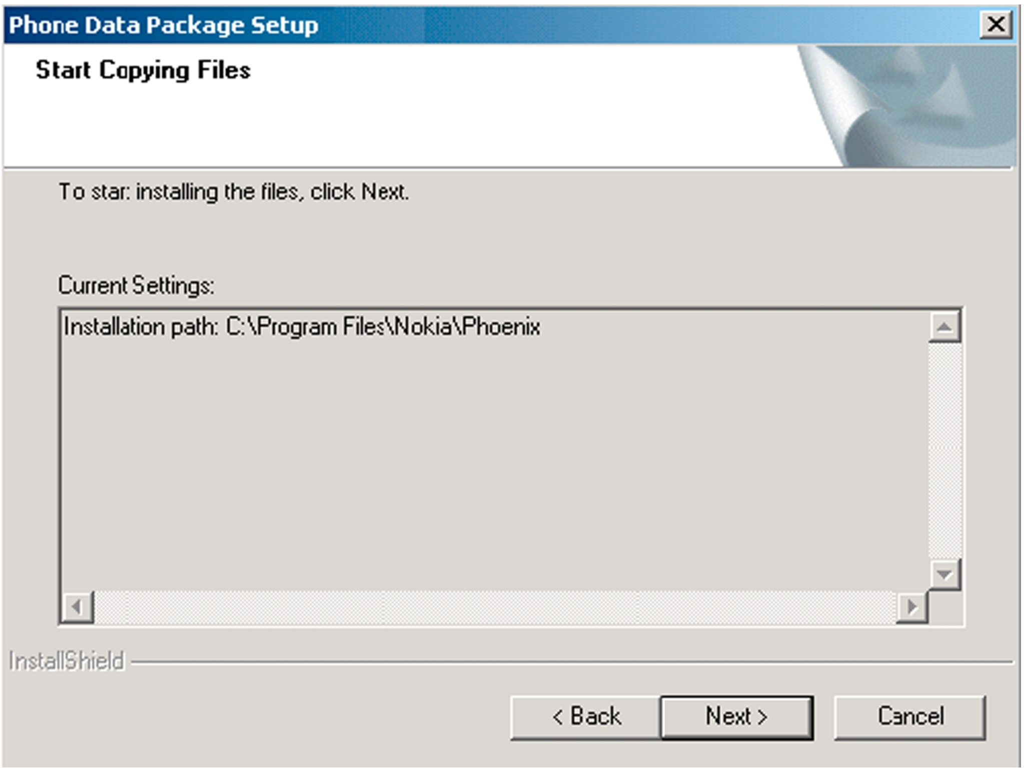
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

Destination Folder: C:\Program Files\Nokia\Phoenix

Figure 11 Data package destination folder

The InstallShield Wizard checks where *Phoenix* is installed, and the directory is shown.

6. To start copying the files, click **Next**.



Phone Data Package Setup

Start Copying Files

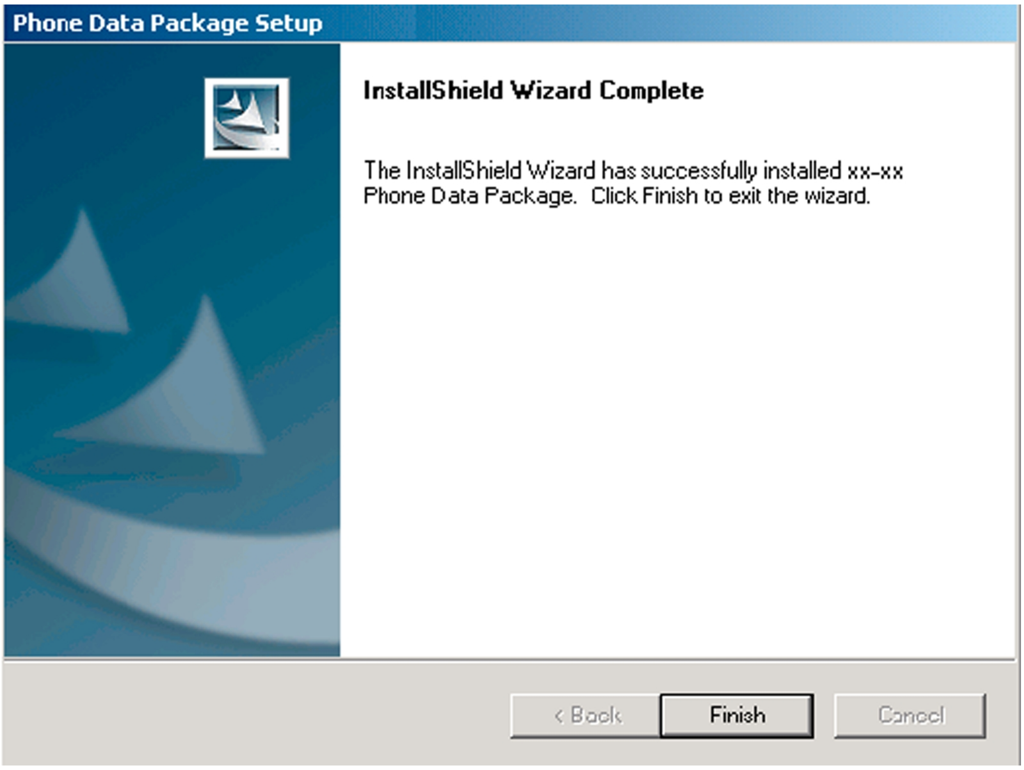
To start installing the files, click Next.

Current Settings:

Installation path: C:\Program Files\Nokia\Phoenix

Phone model specific files are installed. Please wait.

7. To complete the installation, click **Finish**.



InstallShield Wizard Complete

The InstallShield Wizard has successfully installed xx-xx Phone Data Package. Click Finish to exit the wizard.

Figure 12 InstallShield Wizard Complete

Next action

Phoenix can be used for flashing phones and printing type labels after:

- Configuring users
- Managing connections

FPS-8 and FPS-10 can be used after updating their flash update package files.

Uninstalling phone data package

Context

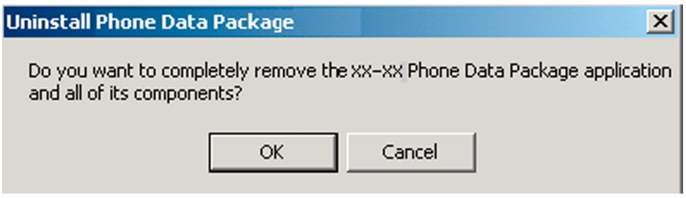
There is no need to uninstall an older version of a data package, unless instructions to do so are given in the *readme.txt* file of the data package and bulletins related to the release.

Please read all related documents carefully.

Steps

1. Locate the data package installation file (e.g. *XX-XX_dp_EA_v_1_0.exe*) from your computer.
2. To start the uninstallation procedure, double-click the data package installation file.

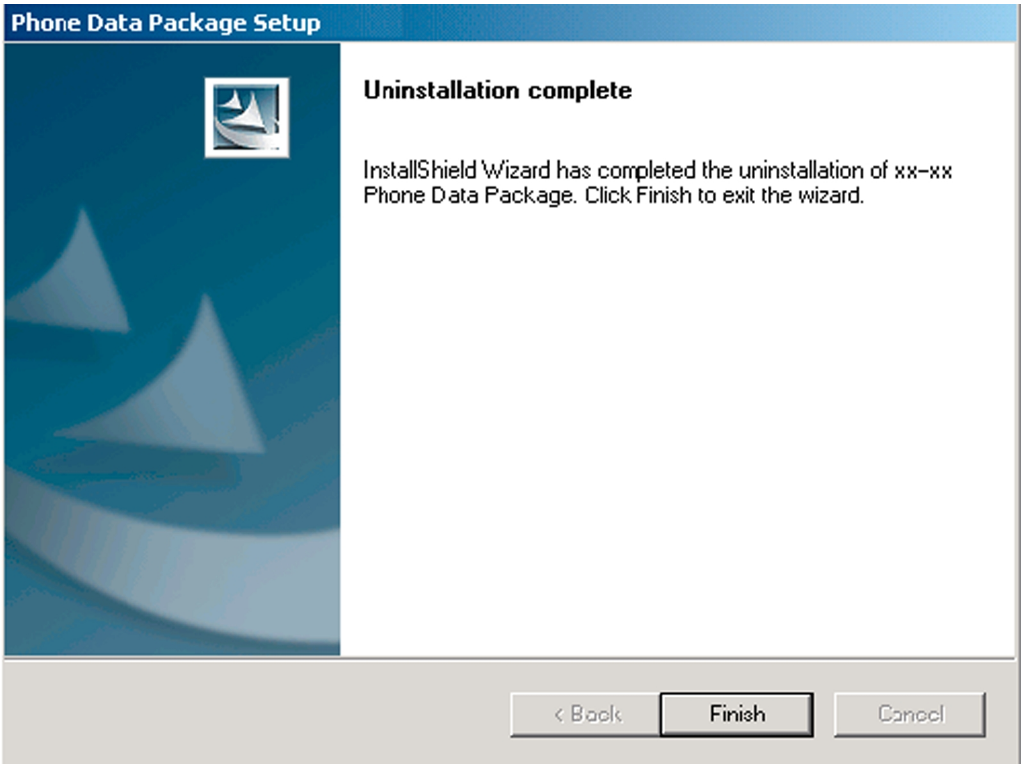
3. To uninstall the data package, click **OK** or to interrupt the uninstallation, click **Cancel**.


Uninstall Phone Data Package
OK
Cancel

Do you want to completely remove the xx-xx Phone Data Package application and all of its components?

Figure 13 Uninstalling phone data package

4. When the data package is uninstalled, click **Finish**.


Phone Data Package Setup
< Back
Finish
Cancel

Uninstallation complete

InstallShield Wizard has completed the uninstallation of xx-xx Phone Data Package. Click Finish to exit the wizard.

Figure 14 Finishing data package uninstallation

Alternative steps

- You can also uninstall the data package manually from **Control Panel→Add/Remove Programs→xx-xx* Phone Data Package** . (*= type designator of the phone).

Configuring users in *Phoenix*

Steps

1. Start *Phoenix* service software, and log in.

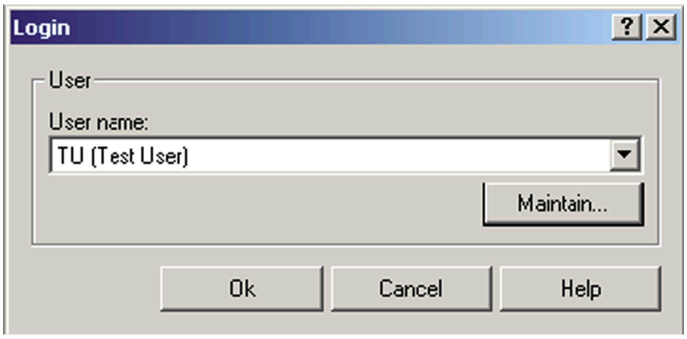


Figure 15 Phoenix login

   If the user ID is already configured, select s/he from the *User name* drop-down list, and click **OK**.
2. To add a new user, or to edit existing ones, click **Maintain**.
3. To add a new user, click **New**.
4. Type in the name and initials of the user, and click **OK**.

   The user is added to the user name list.
5. Select the desired user from the *User name* drop-down list, and click **OK**.

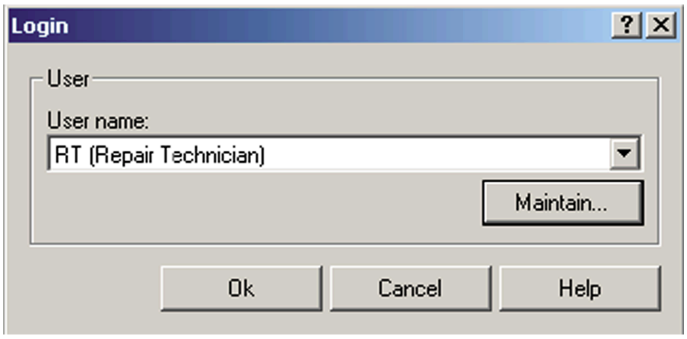


Figure 16 New user configured

Managing connections in *Phoenix*

Context

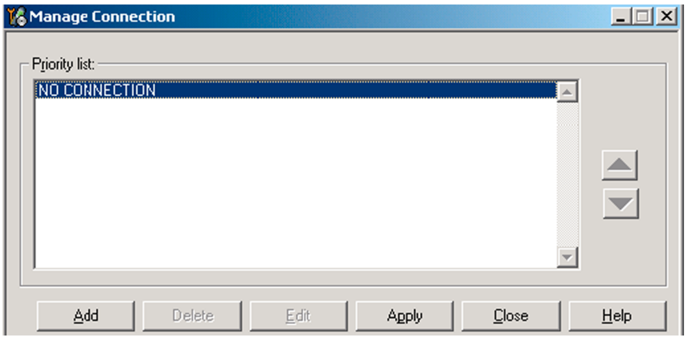
With the **Manage Connections** feature you can edit and delete existing connections or create new ones.

> **Note:** After choosing the desired connection, and connecting the phone to a PC for the first time, allow the PC to install the USB device drivers first. Please note that this may take some time to complete.
>
> If there are problems after the driver installation, check that the USB connection is active from the **Windows Control Panel**. If the problem persists, contact the local PC support.

Steps

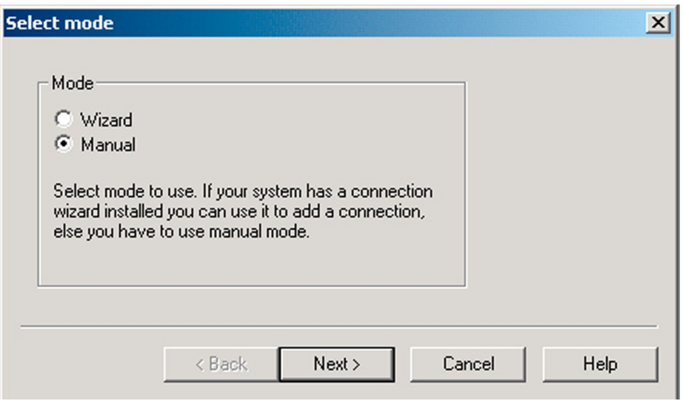
1. Start *Phoenix*, and log in.
2. Choose **File→Manage Connections...** .

3. To add a new connection, click **Add**.



4. Select **Manual** mode, and click **Next** to continue.

   If you want to create the connection using the Connection Wizard, connect the tools and a phone to your PC. The wizard will automatically try to configure the correct connection.



Mode
○ Wizard
● Manual

Select mode to use. If your system has a connection wizard installed you can use it to add a connection, else you have to use manual mode.

Figure 17 Select mode: Manual

i For an FPS-10 flash prommer with a **USB Connection**, choose the following connection settings:
  - Media: **FPS-10 USB**
  - DEVICE_INDEX: **0**
  - SERIAL_NUM: See Serial No from the label attached to the bottom of FPS-10
  - ACTIVE_MEDIA: **USB**

ii For an FPS-10 flash prommer with a **LAN connection**, choose the following connection settings:
  - Media: **FPS-10 TCP/IP**
  - NET_SERV_NAME: Click **Scan...**. Choose your own FPS-10 device based on the correct MAC address. See Serial No from the label attached to the bottom of your FPS-10.
  - PORT_NUM: Use the default value, and click **Next**.
  - PROTOCOL_FAMILY: Use the default value, and click **Next**.
  - SOCKET TYPE: Use the default value, and click **Next**.
  - TX_BUFFER_SIZE: Use the default value, and click **Next**.
  - RX_BUFFER_SIZE: Use the default value, and click **Next**.

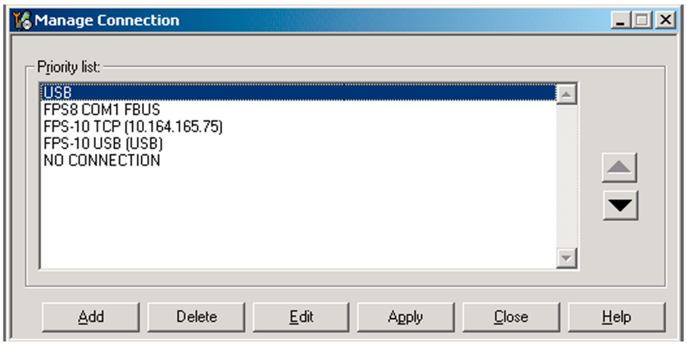
iii For an FPS-8 flash prommer, choose the following connection settings:
  - Media: FPS-8
  - PORT_NUM: COM Port where FPS-8 is connected
  - COMBOX_DEF_MEDIA: **FBUS**

iv For a plain **USB connection**, choose the following connection settings:

Note: First connect the DKU-2 USB cable between the PC USB port and phone.

- Media: USB

5. To complete the configuration, click **Finish**.
6. Click the connection you want to activate. Use the up/down arrows located on the right hand side to move it on top of the list, then click **Apply**.



Priority list:

USB
FPS8 COM1 FBUS
FPS-10 TCP (10.164.165.75)
FPS-10 USB (USB)
NO CONNECTION

Figure 18 Connections list

The connection is activated, and it can be used after closing the *Manage Connection* window.

The connection information is shown at the right hand bottom corner of the screen.

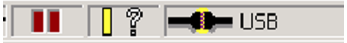
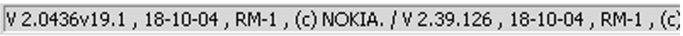


Figure 19 Connection information

7. To use the connection, connect the phone to your PC with correct service tools. Make sure the phone is switched on, and then choose **File→Scan Product** .

Results

The product support module information appears in the status bar:



V 2.0436v19.1 , 18-10-04 , RM-1 , (c) NOKIA. / V 2.39.126 , 18-10-04 , RM-1 , (c)

Figure 20 Product support module information (example from RM-1)

Installing flash support files for FPS-8 and FPS-10

Before you begin

- Install *Phoenix* service software.
- Install phone model specific data package for *Phoenix*.
- If you want to update the flash support files, they are delivered in the same installation package with *Phoenix* or newer *Phoenix* packages beginning from December 2004.

  In case you want to update the MCU files, install the latest data package (see Technical Bulletins for information on the latest one).

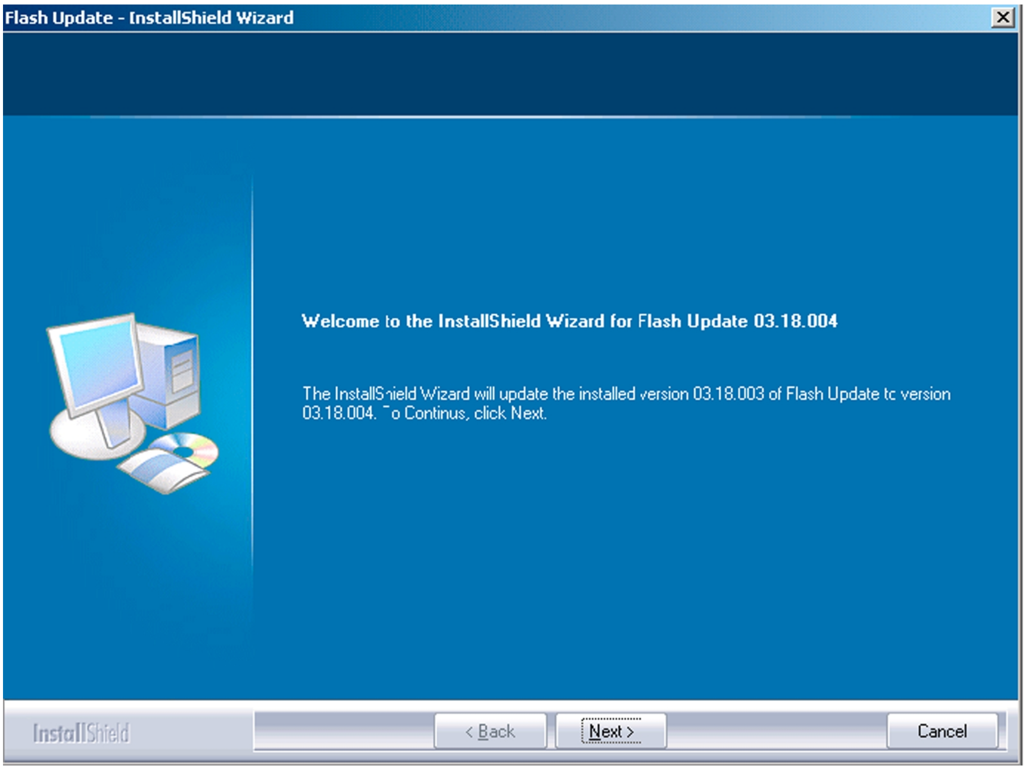
  Normally, it is enough to install *Phoenix* and the phone-specific data package because the installation always includes the latest flash update package files for FPS-8 and FPS-10.
- A separate installation package for flash support files is available. The files can be updated according to these instructions, if updates appear between *Phoenix* data package releases.

Context

If you are not using a separate installation package, you can skip this section and continue with "Updating FPS-8 and FPS-10 flash prommer software" (page 3–22) after installing a new phone data package.

Steps

1. To begin the installation, double-click the flash update file (for example, *flash_update_03_183_0014.exe*).



Welcome to the InstallShield Wizard for Flash Update 03.18.004

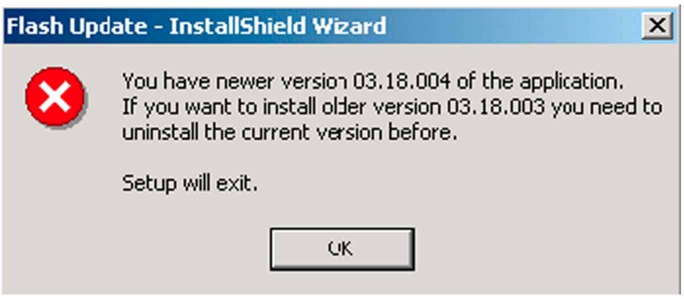
The InstallShield Wizard will update the installed version 03.18.003 of Flash Update to version 03.18.004. To Continue, click Next.

Figure 21 Flash update welcome dialog

   If the same version of the flash update package already exists, and you want to reinstall it, the previous package is first uninstalled.

   Restart installation again after the uninstallation.

2. If you try to downgrade the existing version to older ones, the setup will be aborted. If there is a need to downgrade the version, uninstall newer files manually from the **Windows Control Panel**, and then rerun the installation.



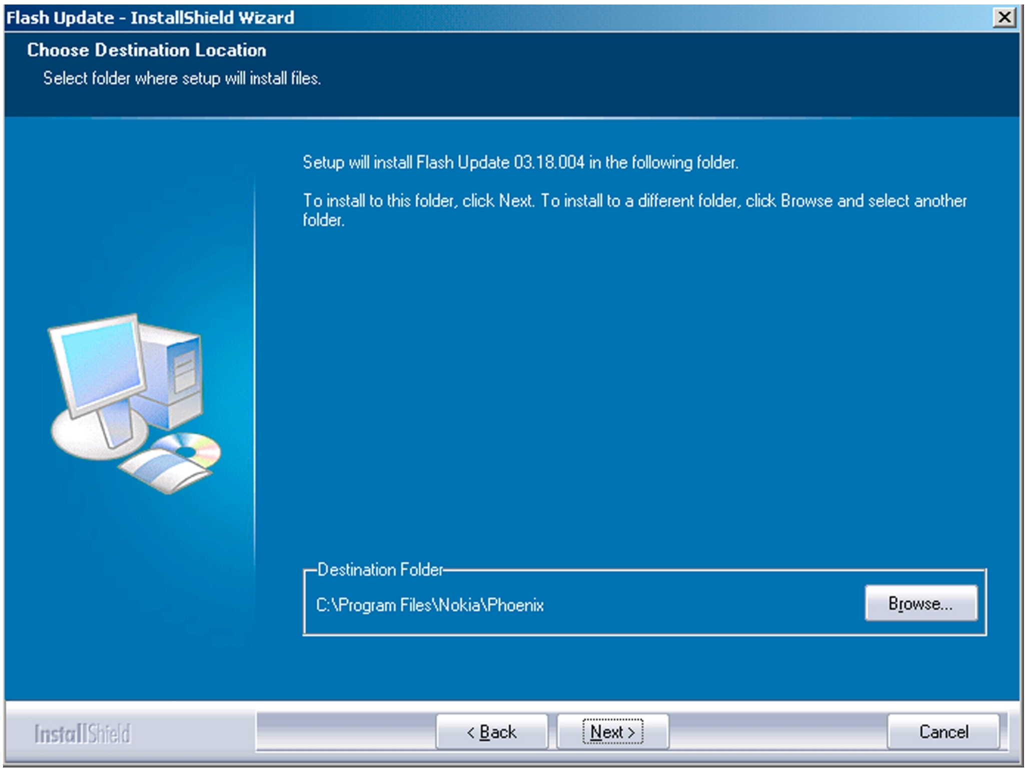
You have newer version 03.18.004 of the application.
If you want to install older version 03.18.003 you need to uninstall the current version before.

Setup will exit.

Figure 22 Flash installation interrupted

   If an older version exists on your PC and it needs to be updated, click **Next** to continue installation.

3. It is recommended to install the files to the default destination folder *C:|Program Files|Nokia|Phoenix*. To continue, click **Next**.



Flash Update - InstallShield Wizard

Choose Destination Location

Select folder where setup will install files.

Setup will install Flash Update 03.18.004 in the following folder.

To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

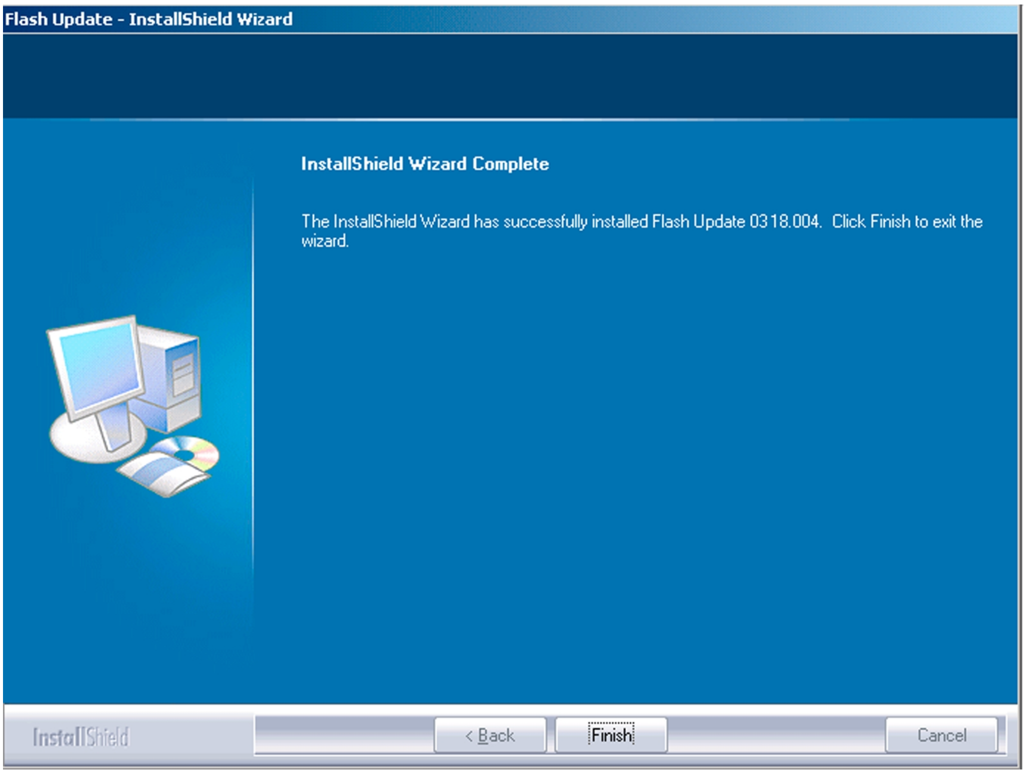
Destination Folder

C:\Program Files\Nokia\Phoenix

Figure 23 Flash destination folder

When installing the flash update files for the first time, you may choose another location by selecting **Browse** (not recommended).

4. To complete the installation procedure, click **Finish** .



Flash Update - InstallShield Wizard

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed Flash Update 0318.004. Click Finish to exit the wizard.

InstallShield
< Back
Finish
Cancel

Figure 24 Finish flash update

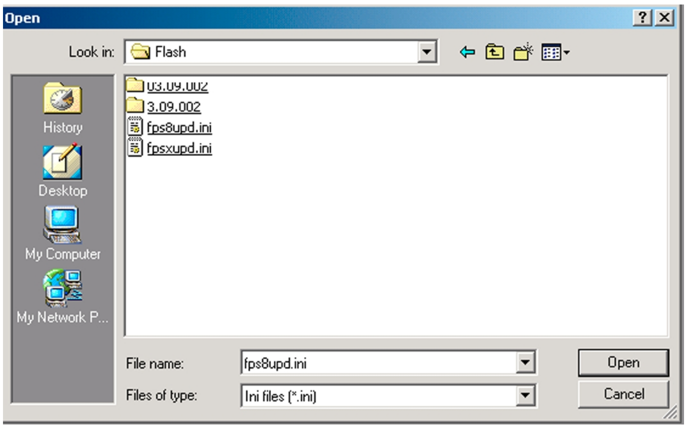
Next action

FPS-8 and FPS-10 flash prommers must be updated using *Phoenix*.

Updating FPS-8 and FPS-10 flash prommer software

Steps

1. Start *Phoenix* service software, and log in.
2. Choose the correct connection for your flash prommer: **File→Manage Connections...**
3. Choose **Flashing→Prommer maintenance** .
4. To update the **FPS-8/FPS-10** software, click **Update**, and select the appropriate file *fps8upd.ini* (for FPS-8) or *fpsxupd.ini* (for FPS-10) from *C:|Program Files|Nokia|Phoenix|Flash*.



Open
? X
History
Desktop
My Computer
My Network P...
Open
Cancel

Look in: Flash

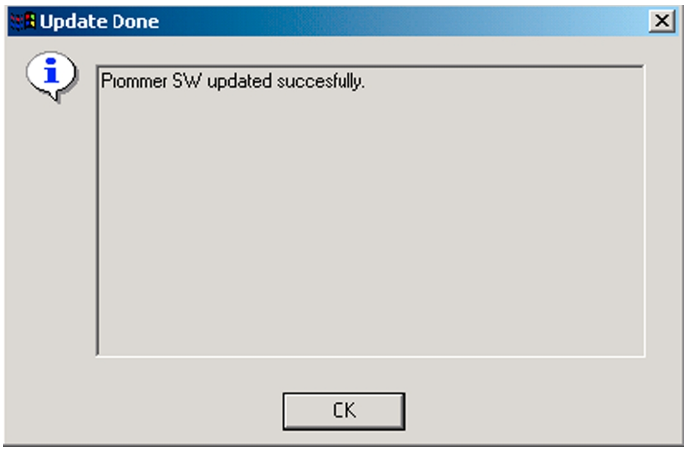
03.09.002
3.09.002
fps8upd.ini
fpsxupd.ini

File name: fps8upd.ini
Files of type: Ini files (*.ini)

Figure 25 Flash directory window

Tip: All files can be loaded separately to the prommer used. To do this, click the right mouse button in the *Flash Box Files* pane and select the file type(s) to be loaded.

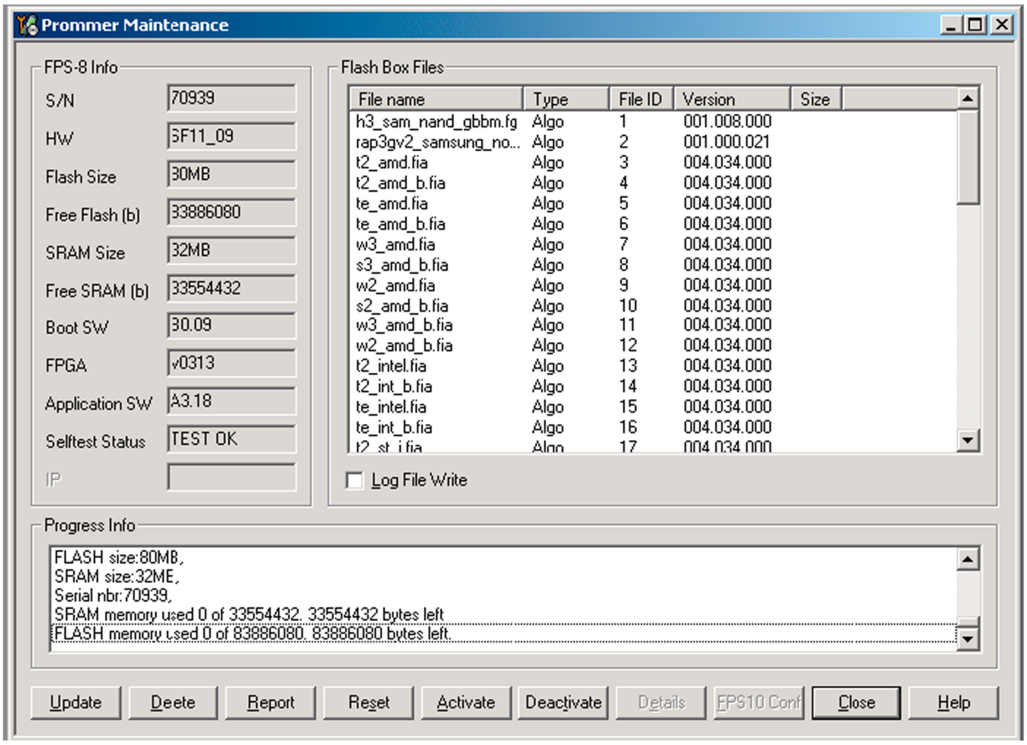
5. Click **OK**.



Prommer SW updated succesfully.

Figure 26 Prommer software update finished

6. To close the *Prommer Maintenance* window, click **Close**.



FPS-8 Info
S/N 70939
HW 5F11_09
Flash Size 30MB
Free Flash (b) 33886080
SRAM Size 32MB
Free SRAM (b) 33554432
Boot SW 30.09
FPGA v0313
Application SW A3.18
Selftest Status TEST OK
IP

Flash Box Files

File name	Type	File ID	Version	Size
h3_sam_nand_gbbm.fg	Algo	1	001.008.000	
rap3gv2_samsung_no...	Algo	2	001.000.021	
t2_amd.fia	Algo	3	004.034.000	
t2_amd_b.fia	Algo	4	004.034.000	
te_amd.fia	Algo	5	004.034.000	
te_amd_b.fia	Algo	6	004.034.000	
w3_amd.fia	Algo	7	004.034.000	
s3_amd_b.fia	Algo	8	004.034.000	
w2_amd.fia	Algo	9	004.034.000	
s2_amd_b.fia	Algo	10	004.034.000	
w3_amd_b.fia	Algo	11	004.034.000	
w2_amd_b.fia	Algo	12	004.034.000	
t2_intel.fia	Algo	13	004.034.000	
t2_int_b.fia	Algo	14	004.034.000	
te_intel.fia	Algo	15	004.034.000	
te_int_b.fia	Algo	16	004.034.000	
t2_st_i.fia	Algo	17	004.034.000	

☐ Log File Write

Progress Info

```
FLASH size:80MB,
SRAM size:32ME,
Serial nbr:70939,
SRAM memory used 0 of 33554432. 33554432 bytes left
FLASH memory used 0 of 83886080. 83886080 bytes left.
```

Figure 27 ***Prommer Maintenance*** **window**

Activating FPS-8

Context

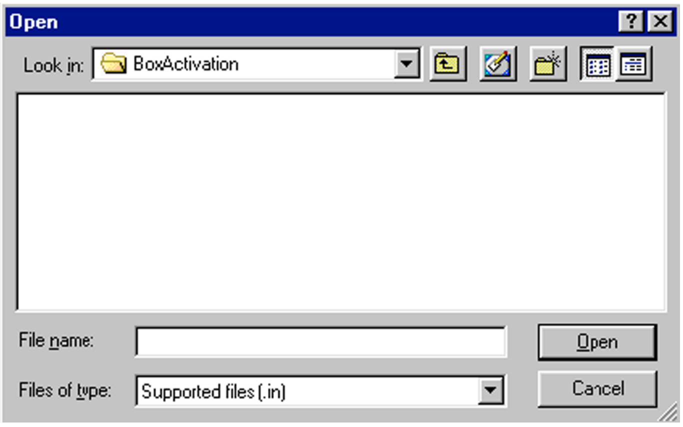
Before FPS-8 can be successfully used for phone programming, it must first be activated.

First fill in the *FPS-8 activation request* sheet in the FPS-8 sales package, and follow the instructions given.

When activation file is received (for example, *00000.in*), copy it to the *C:|ProgramFiles|Nokia|Phoenix |BoxActivation* directory on your computer (this directory is created when *Phoenix* is installed).

Steps

1. Start *Phoenix* service software.
2. Choose **Flashing→Prommer Maintenance** .
3. In the *Prommer Maintenance* window, click **Activate**.
4. To find the activation file, click **Browse**.
5. To activate the prommer, select the activation file and click **Open**.



Files of type: Supported files (.in)

Figure 28 Box activation

6. To complete the activation, restart FPS-8.

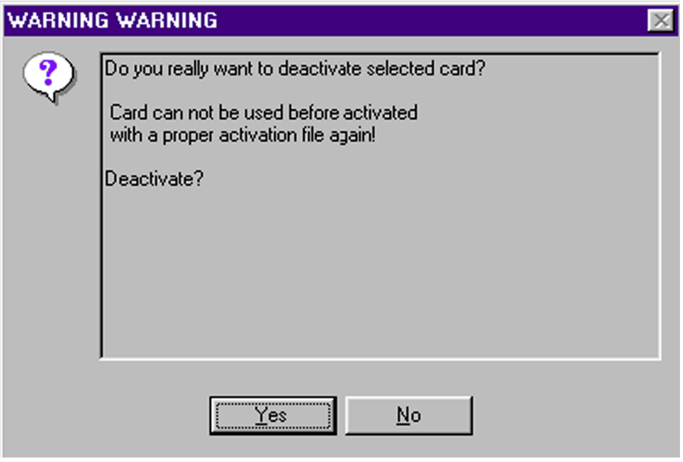
Deactivating FPS-8

Context

If there is, for example, a need to send the FPS-8 box for repair, it must be deactivated first.

Steps

1. Start *Phoenix* service software.
2. Choose **Flashing→Prommer Maintenance** .
3. In the *Prommer Maintenance* window, click **Deactivate**.
4. To confirm the deactivation, click **Yes**.



Do you really want to deactivate selected card?

Card can not be used before activated
with a proper activation file again!

Deactivate?

Figure 29 Deactivation warning

The box is deactivated.

5. To complete the deactivation, restart FPS-8.

(This page left intentionally blank.)

4 — Service Tools and Service Concepts

(This page left intentionally blank.)

Table of Contents

Service tools....4–5
CA-35S....4–5
CA-53....4–5
CU-4....4–6
DKU-2....4–7
FPS-10....4–7
FS-8....4–8
JBT-9....4–8
MJ-82....4–9
PCS-1....4–9
PKD-1....4–10
RJ-92 4–10
RJ-93....4–10
SA-93....4–11
SPS-1....4–12
SRT-6....4–12
SS-46....4–12
SS-62....4–12
SS-72....4–13
ST-40....4–13
XCS-4....4–13
XRE-2....4–13
XRF-1....4–14
Service concepts....4–14
Service concepts....4–14

List of Tables

Table 9 Attenuation values for RM-115/RM-126....4–11

List of Figures

Figure 30 POS flash concept....4–14
Figure 31 FPS-10 flash concept....4–15
Figure 32 FPS-10 flashing and BB tuning concept....4–16
Figure 33 FPS-10 flashing and RF testing/BB tuning concept....4–17
Figure 34 Module jig tuning concept....4–18
Figure 35 Module jig tuning and FPS-10 flash concept....4–19

(This page left intentionally blank.)

Service tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-115; RM-126, refer to various concepts.

	CA-35S	Power cable	
	CA-35S is a power cable for connecting, for example, the FPS-10 flash prommer to the Point-Of-Sales (POS) flash adapter.		
	CA-53	USB connectivity cable	
	USB to system connector cable.		

CU-4	Control unit	

CU-4 is a general service tool used with a module jig and/or a flash adapter. It requires an external 12 V power supply.

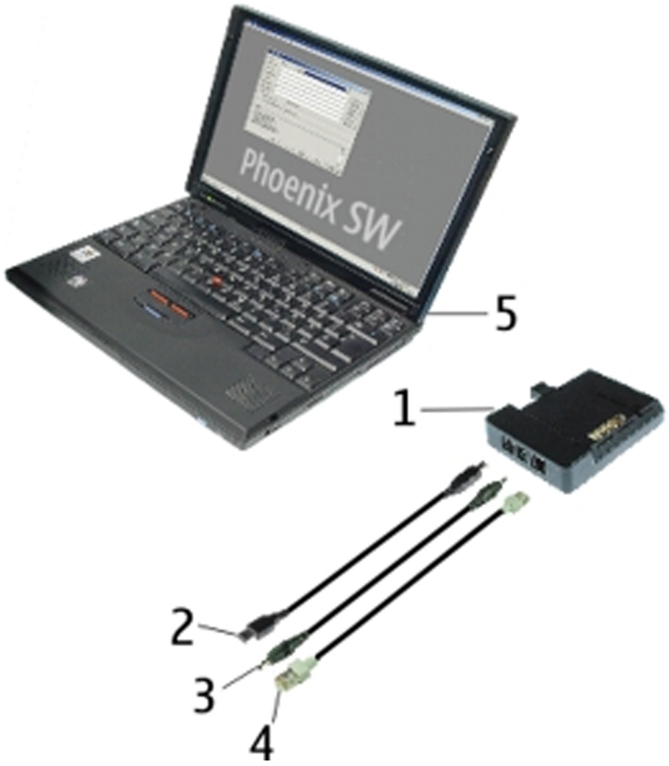
The unit has the following features:

- software controlled via USB
- EM calibration function
- Forwards FBUS/Flashbus traffic to/from terminal
- Forwards USB traffic to/from terminal
- software controlled BSI values
- regulated VBATT voltage
- 2 x USB2.0 connector (Hub)
- FBUS and USB connections supported

When using CU-4, note the special order of connecting cables and other service equipment:

Instructions

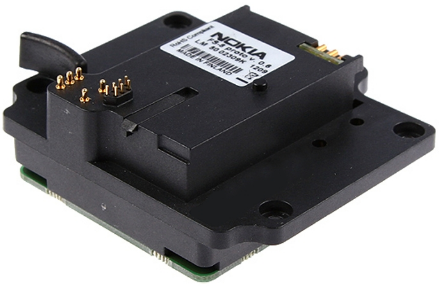
1 Connect a service tool (jig, flash adapter) to CU-4.
2 Connect CU-4 to your PC with a USB cable.
3 Connect supply voltage (12 V)
4 Connect an FBUS cable (if necessary).
5 Start Phoenix service software.

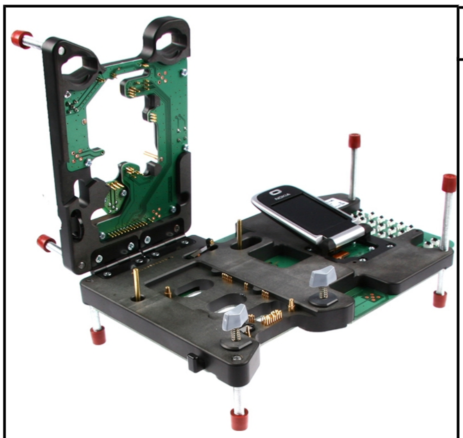


Note: Phoenix enables CU-4 regulators via USB when it is started.

Reconnecting the power supply requires a Phoenix restart.

<table>
<tr><td rowspan="2"> </td><td>DKU-2</td><td>USB connectivity cable</td><td></td></tr>
<tr><td colspan="3">USB to system connector cable.</td></tr>
<tr><td rowspan="2"> </td><td>FPS-10</td><td>Flash prommer</td><td></td></tr>
<tr><td colspan="3">FPS-10 interfaces with:
• PC
• Control unit
• Flash adapter
• Smart card
FPS-10 flash prommer features:
• Flash functionality for BB5 and DCT-4 terminals
• Smart Card reader for SX-2 or SX-4
• USB traffic forwarding
• USB to FBUS/Flashbus conversion
• LAN to FBUS/Flashbus and USB conversion
• Vusb output switchable by PC command
FPS-10 sales package includes:
• FPS-10 prommer
• Power Supply with 5 country specific cords
• USB cable</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>FS-8</td><td>Product specific adapter</td><td></td></tr>
<tr><td colspan="3">The product specific adapter can be used for assembled phones.
FS-8 is an interface between a phone and the concerning SS-46 or SS-62 device. It is needed in case the assembled phone needs to be contacted, except the DKU-2 or the CA-53 cable can be used (over USB).
Features include:
• Compatible to SS-46 (similar to DCT-4 flash adapter), supports flashing
• Compatible to SS-62 (similar to DCT-4 docking station adapter), a PC can be connected by using SS-46 or CU-4
  • Using SS-46: flashing is supported
  • Using CU-4: supports flashing, management calibration is supported.
  • SA-93 coupler can be attached for RF go/no-go tests
• Easy phone attachment and detachment
• Reliable phone locking
• Replaceable test pins</td></tr>
<tr><td rowspan="2"> </td><td>JBT-9</td><td>Bluetooth test and interface box (sales package)</td><td></td></tr>
<tr><td colspan="3">The JBT-9 test box is a generic service device used to perform Bluetooth bit error rate (BER) testing, and establishing cordless FBUS connection via Bluetooth. An ACP-8x charger is needed for BER testing and an AXS-4 cable in case of cordless interface usage testing .
Sales package includes:
• JBT-9 test box
• Installation and warranty information</td></tr>
</table>



MJ-82	Module repair jig	

MJ-82 is meant for component level trouble shooting The jig includes RF interface for GSM and Bluetooth.

General features include:

- Provides mechanical interface for engine module
- Provides galvanic connection to all needed test pads in module
- UI test interface
- Audio components MIC, earpiece, IHF
- Unlimited operation of a disassembled RM-115/126 phone module
- Power supply via CU-4

  Note: CU-4 is needed to operate MJ-82. CU-4 is not part of the MJ-82 sales package and has to be ordered separately.

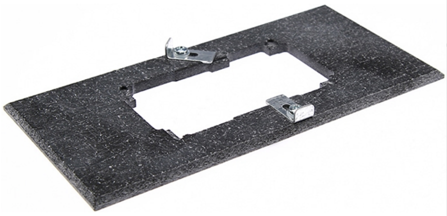
- **Attenuation values for MJ-82**

Frequency (Hz)	Loss (dB)
836600000	0.14
881600000	0.14
897400000	0.14
942400000	0.14
1747800000	0.38
1842800000	0.34
1880000000	0.34
1950000000	0.31
1960000000	0.31
2140000000	0.44

The UI module is not installed because of logistic issues. The following parts must be installed (please refer to the Mechanical parts list): A2, I002, I003. I101, I102, I103, I104, I010, I105, A3, A4 and A5.

PCS-1	Power cable	

The PCS-1 power cable (DC) is used with a docking station, a module jig or a control unit to supply a controlled operating voltage.

<table>
<tr><td rowspan="2"> </td><td>PKD-1</td><td>SW security device</td><td></td></tr>
<tr><td colspan="3">SW security device is a piece of hardware enabling the use of the service software when connected to the parallel (LPT) port of the PC.
Without the device, it is not possible to use the service software.
Printer or any such device can be connected to the PC through the device if needed.</td></tr>
<tr><td rowspan="2"></td><td>RJ-92</td><td>Soldering jig</td><td></td></tr>
<tr><td colspan="3">This soldering jig is used for module level repair, either as fixation in µBGA rework places or when there is a need to hold a module on the work bench for any other repair.
Features include:
• Convenient locking mechanism
• Four (optional mount) rubber feet allow usage also on repair benches
• Fixation of phone module in both ways possible (bottom or top side up)
• ESD proof material
• Standard uBGA jig thickness and outer dimensions</td></tr>
<tr><td rowspan="2"> </td><td>RJ-93</td><td>Rework jig</td><td></td></tr>
<tr><td colspan="3">RJ-93 is used as a rework jig for the engine module.
This stencil takes the front end module (FEM) or power amplifier (PA) module for spreading the soldering paste to the component. Must be used together with the ST-40 stencil.</td></tr>
</table>

SA-93	RF coupler	

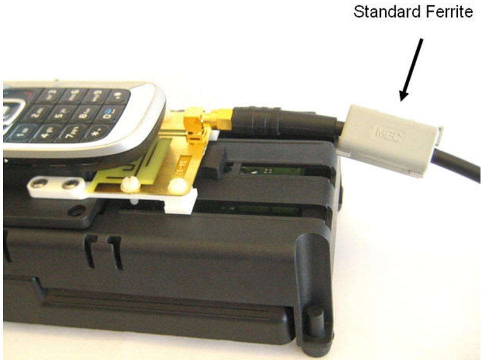
The SA-93 coupler is for GSM RF testing.

The RF antenna coupler for use with FS-8 and SS-62 interface adapter extends CU-4/SS-62/FS-8 set-up to allow RF function tests in GSM bands 850, 900, 1800 and 1900 MHz.

SA-93 is not suitable for RF tuning.

> **Note:** When using the coupler the phone shall be used in open mode.

To reduce noise, place the ferrite like shown in the picture below. (The ferrite is NOT a Nokia specific part, and can therefore not be ordered through the Nokia channel, but from any regular electronic vendor)

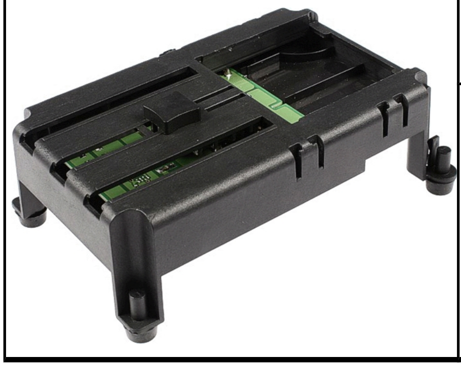


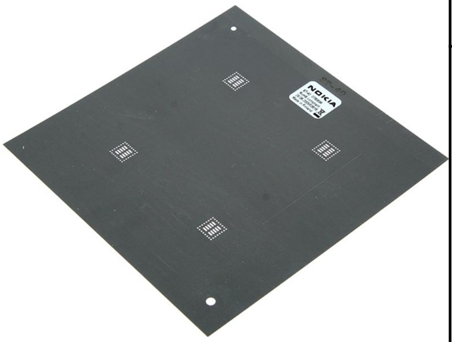
- **Table 9 Attenuation values for RM-115/RM-126**

System	Channel	TX att [dB]	RX att [dB]
EGSM850	128	7.9	6
	190	7.6	7
	251	7.5	8
EGSM900	975	8	8
	38	8.3	8
	124	8.7	8
GSM1800	512	7.7	7
	698	7.2	6
	885	7.5	6
GSM1900	512	6.7	6
	700	6.4	6
	810	6.0	6

TX attenuation tolerance is +/- 1.0 dB

RX attenuation tolerance is +/- 1.0 dB

	SPS-1	Soldering Paste Spreader	
	SRT-6	Opening tool	
	SRT-6 is used to open phone covers and B-to-B connectors.		
	SS-46	Interface adapter	
	SS-46 acts as an interface adapter between the flash adapter and FPS-10.		
	SS-62	Generic flash adapter base for BB5	
	• generic base for flash adapters and couplers • SS-62 equipped with a clip interlock system • provides standardised interface towards Control Unit • provides RF connection using galvanic connector or coupler • multiplexing between USB and FBUS media, controlled by VUSB		

<table>
<tr><td rowspan="2"> </td><td>SS-72</td><td>Domesheet alignment jig</td><td></td></tr>
<tr><td colspan="3">The purpose of this tool is to simplify the attachment process of the domesheet to the keymat PWB and the display bezel the B-cover.</td></tr>
<tr><td rowspan="2"></td><td>ST-40</td><td>PA rework stencil</td><td></td></tr>
<tr><td colspan="3">This stencil is to be used together with RJ-93 and covering FEM module.</td></tr>
<tr><td rowspan="2"> </td><td>XCS-4</td><td>Modular cable</td><td></td></tr>
<tr><td colspan="3">XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.</td></tr>
<tr><td rowspan="2"> </td><td>XRE-2</td><td>Bluetooth cable</td><td></td></tr>
<tr><td colspan="3">The bluetooth cable connects the bluetooth connector of the module jig to the bluetooth test box JBT-9.</td></tr>
</table>

<table>
<tr><td rowspan="2"> </td><td>XRF-1</td><td>RF cable</td><td></td></tr>
<tr><td colspan="3">The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment.
SMA to N-Connector ca. 610mm.
Attenuation for:
• GSM850/900: 0.3+-0.1 dB
• GSM1800/1900: 0.5+-0.1 dB
• WLAN: 0.6+-0.1dB</td></tr>
</table>

Service concepts

Service concepts

POS flash concept

Note: Do not connect an ACP-charger to the phone! This may damage the FEM module.

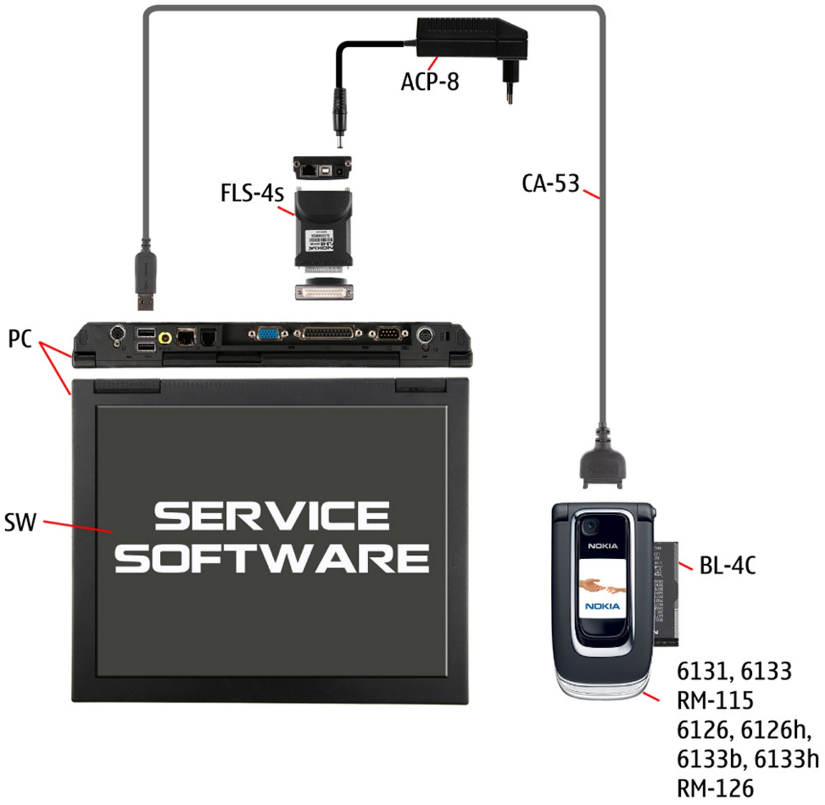

ACP-8
FLS-4s
CA-53
PC
SW
SERVICE
SOFTWARE
BL-4C
6131, 6133
RM-115
6126, 6126h,
6133b, 6133h
RM-126

Figure 30 POS flash concept

FPS-10 flash concept

Note: Do not connect an ACP-charger to the phone! This may damage the FEM module.

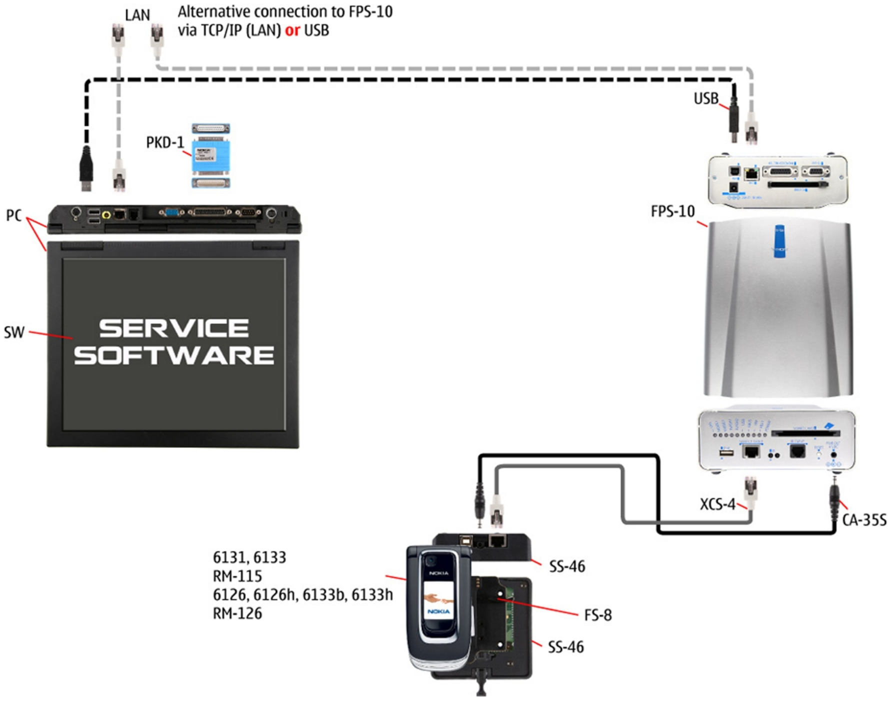

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
USB
PKD-1
PC
FPS-10
SW
SERVICE
SOFTWARE
XCS-4
CA-35S
6131, 6133
RM-115
6126, 6126h, 6133b, 6133h
RM-126
SS-46
FS-8
SS-46

Figure 31 FPS-10 flash concept

FPS-10 flashing and BB tuning concept

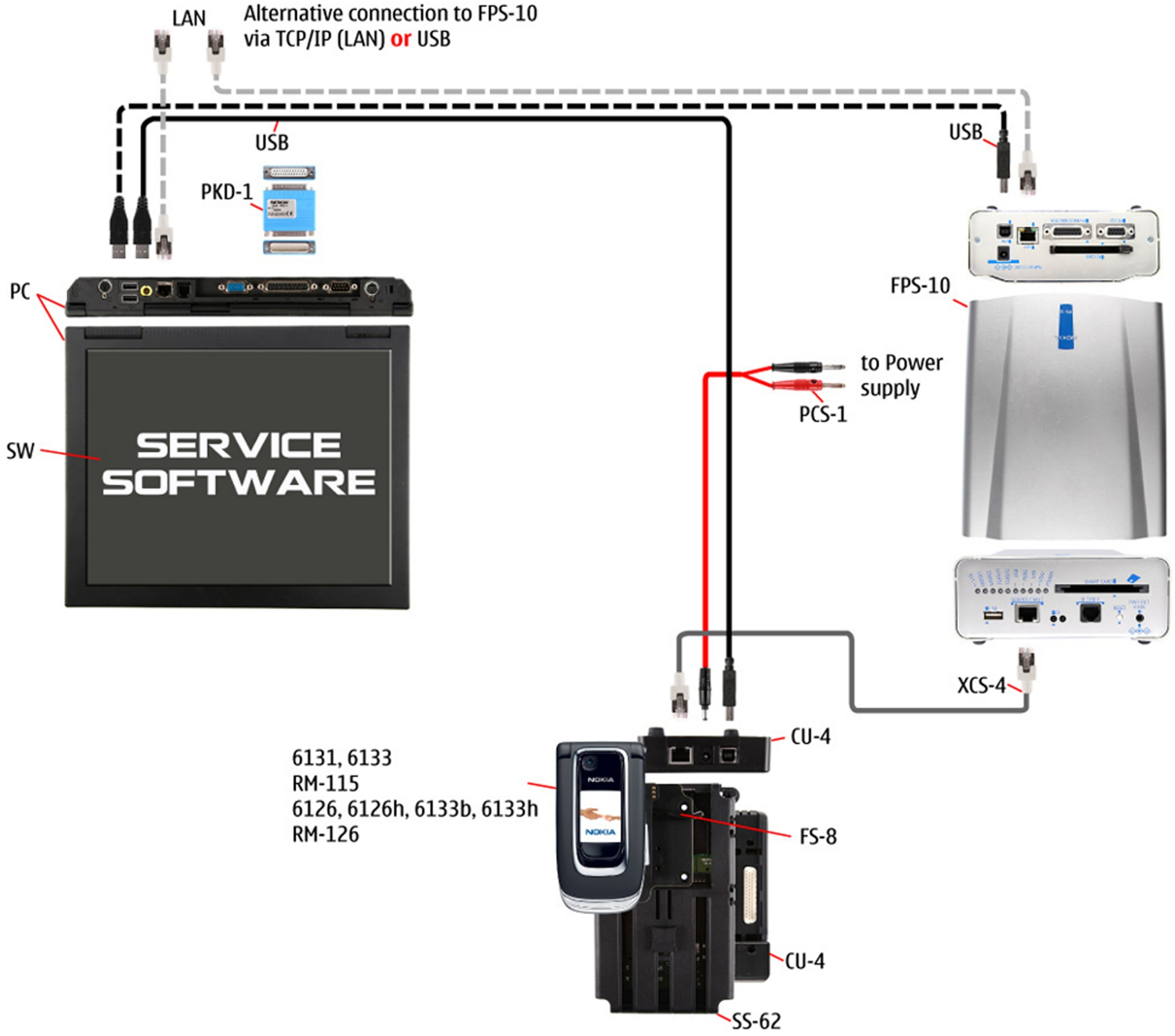
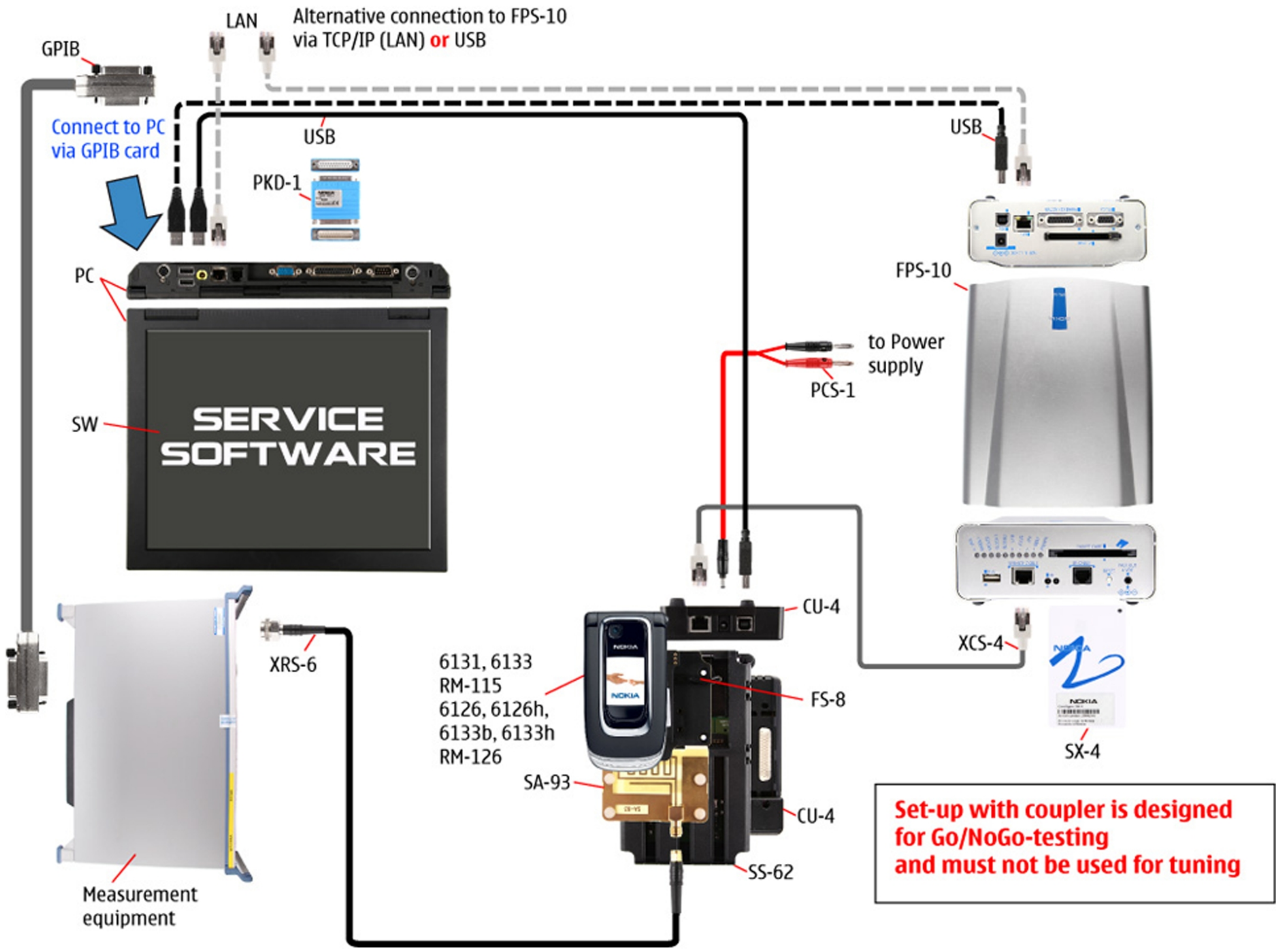

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
USB
PKD-1
USB
PC
SW
SERVICE
SOFTWARE
FPS-10
to Power
supply
PCS-1
XCS-4
CU-4
6131, 6133
RM-115
6126, 6126h, 6133b, 6133h
RM-126
FS-8
CU-4
SS-62

Figure 32 FPS-10 flashing and BB tuning concept

FPS-10 flashing and RF testing/BB tuning concept

Note: Do not connect an ACP-charger to the phone! This may damage the FEM module.


GPIB
LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
Connect to PC
via GPIB card
USB
USB
PKD-1
PC
FPS-10
to Power
supply
PCS-1
SW
SERVICE
SOFTWARE
CU-4
XCS-4
XRS-6
6131, 6133
RM-115
6126, 6126h,
6133b, 6133h
RM-126
FS-8
SX-4
SA-93
CU-4
SS-62
Measurement
equipment

Set-up with coupler is designed for Go/NoGo-testing and must not be used for tuning

Figure 33 FPS-10 flashing and RF testing/BB tuning concept

Module jig tuning concept

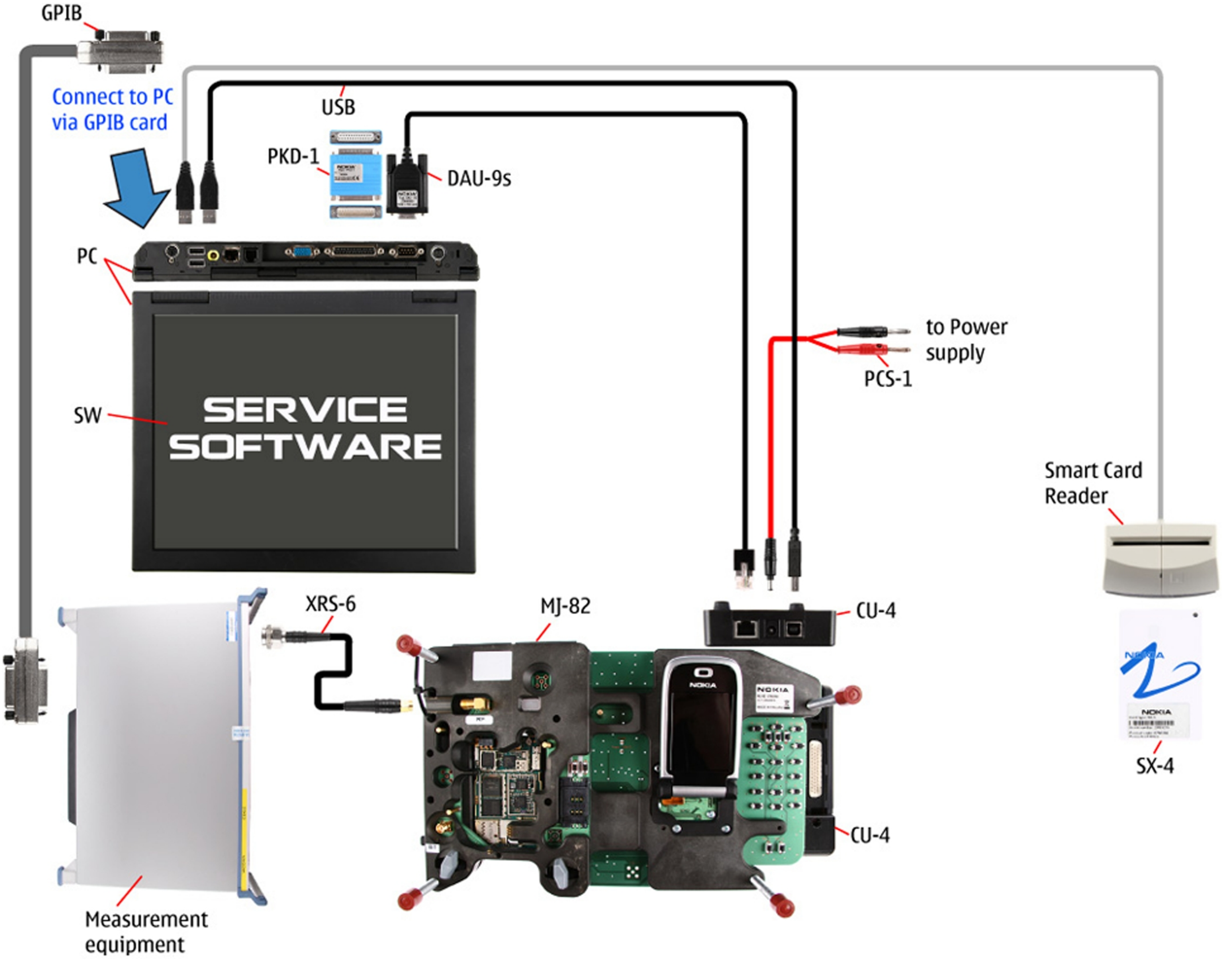

GPIB
Connect to PC via GPIB card
USB
PKD-1
DAU-9s
PC
SW
SERVICE SOFTWARE
to Power supply
PCS-1
Smart Card Reader
XRS-6
MJ-82
CU-4
SX-4
CU-4
Measurement equipment

Figure 34 Module jig tuning concept

Module jig tuning and FPS-10 flash concept

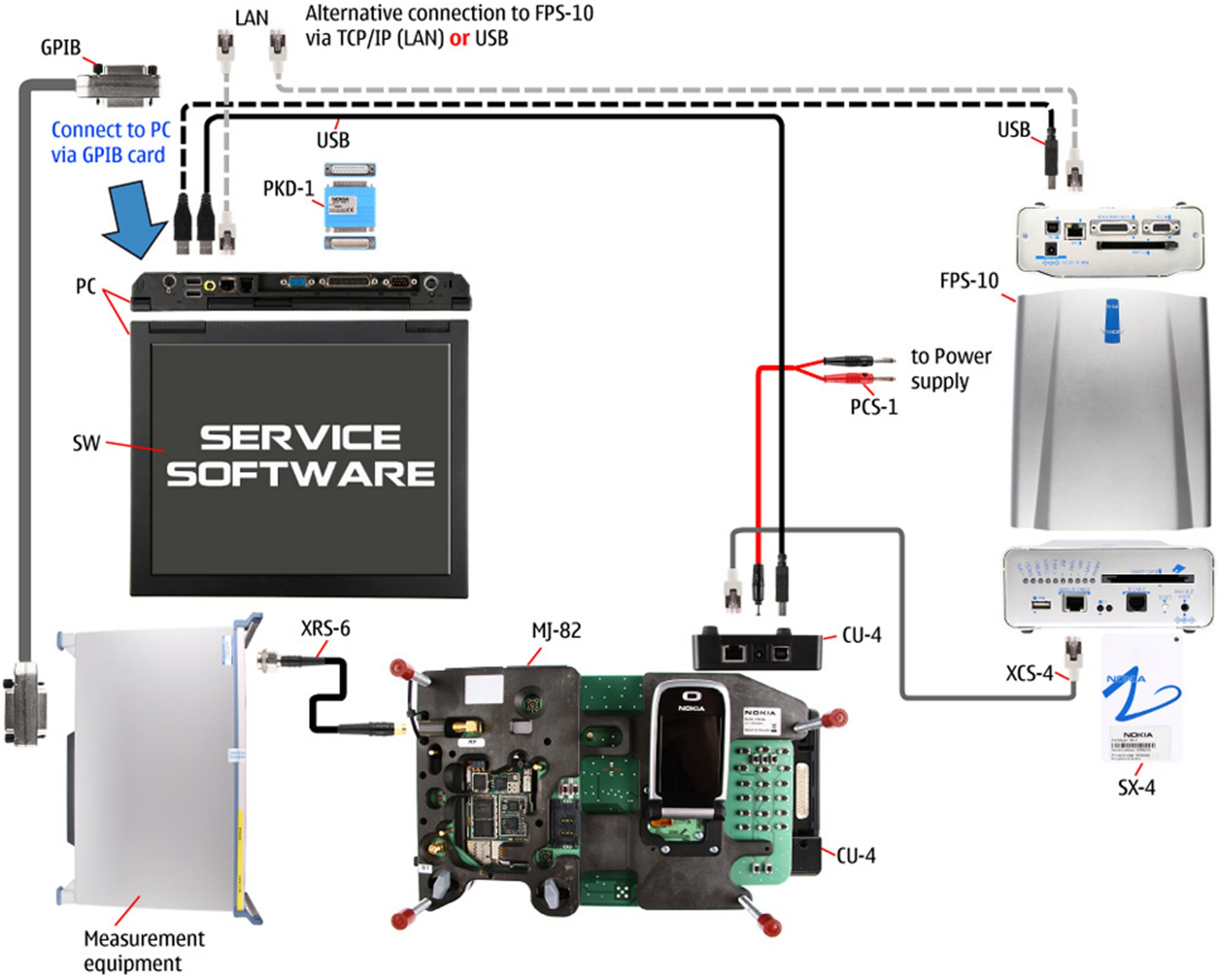

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
GPIB
Connect to PC
via GPIB card
USB
PKD-1
USB
PC
FPS-10
to Power
supply
PCS-1
SW
SERVICE
SOFTWARE
XRS-6
MJ-82
CU-4
XCS-4
SX-4
CU-4
Measurement
equipment

Figure 35 Module jig tuning and FPS-10 flash concept

(This page left intentionally blank.)

5 — Disassembly and reassembly instructions

(This page left intentionally blank.)

Table of Contents

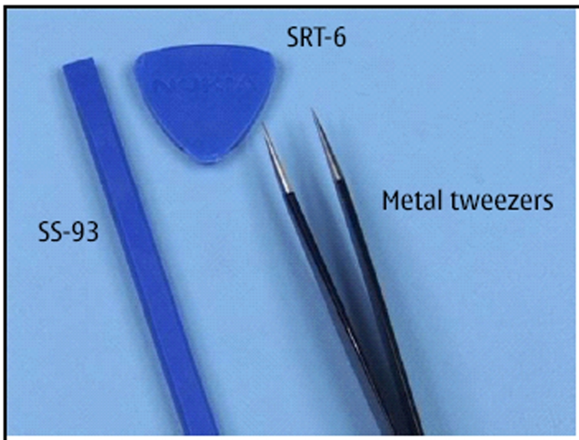
Disassembly instructions (upper block)........5–5
Reassembly instructions (upper block)........5–9
Disassembly instructions (lower block)........5–12
Reassembly instructions (lower block)........5–17

(This page left intentionally blank.)

Disassembly instructions (upper block)

Steps

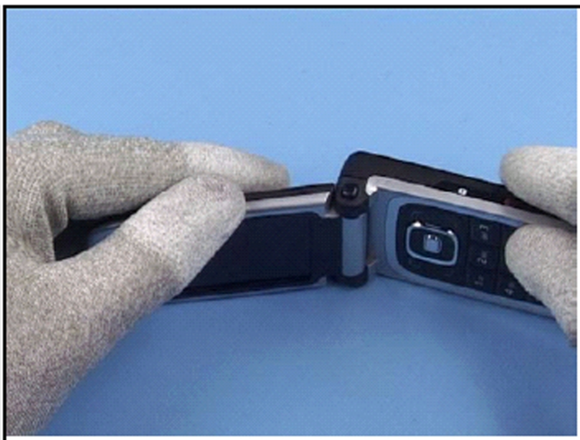
1



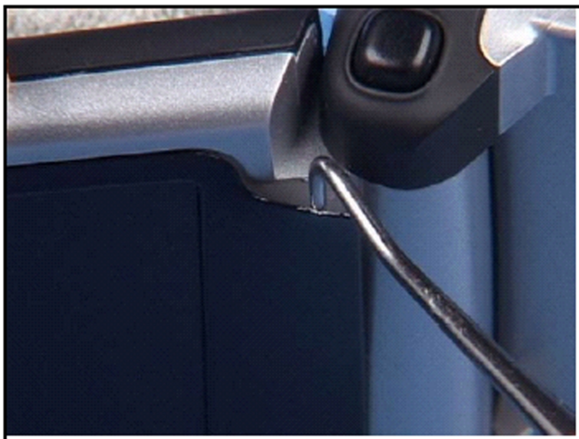
1. Needed tools.

2. Always protect all windows with protective film against dust and scratches.

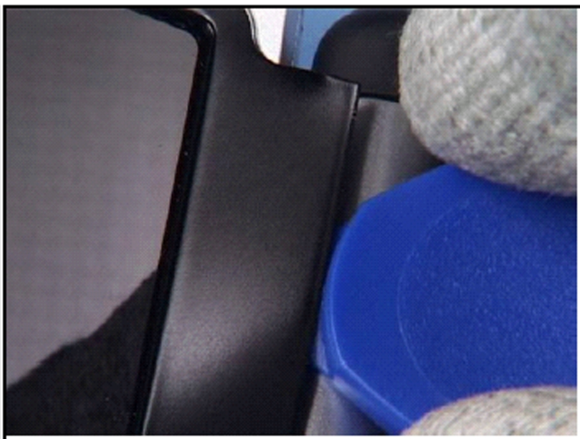
3. Remove the battery, SIM, μSD card if still inside.



4. Open the phone and place it on the table sideways.

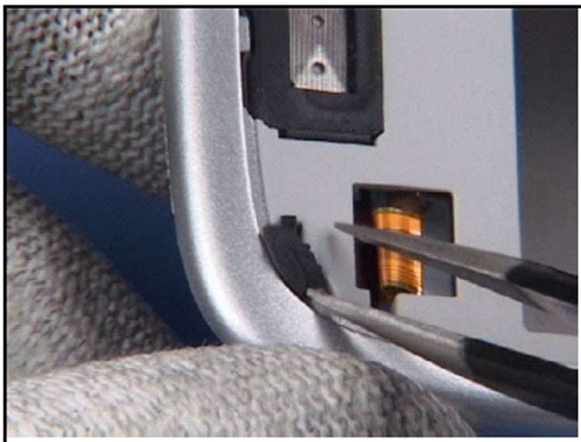


5. Carefully lift up the lower side of the DISPLAY BEZEL, first with the dental tool.

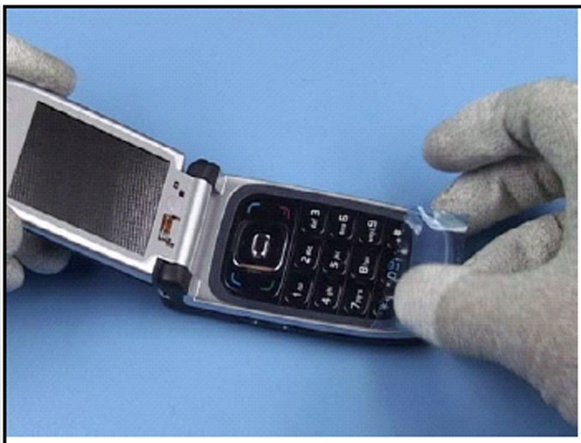


6. Now continue with the SRT-6 and remove the DISPLAY BEZEL. Starting from the shown position up to the earpiece section.

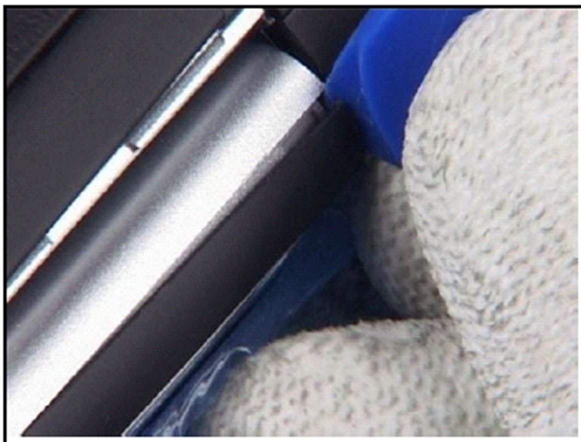
2



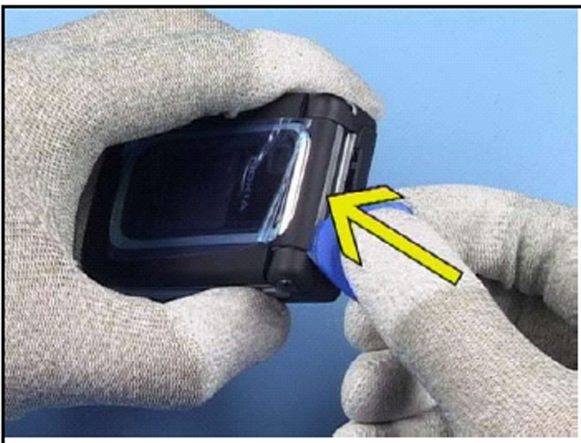
7. Remove both RUBBER STOPPERS with tweezers.



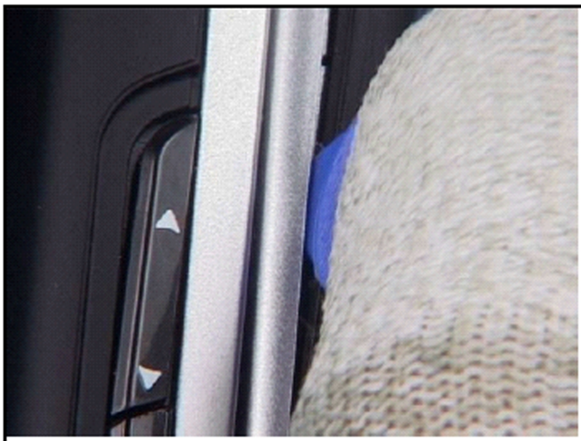
8. Protect the inner side of the lower block.



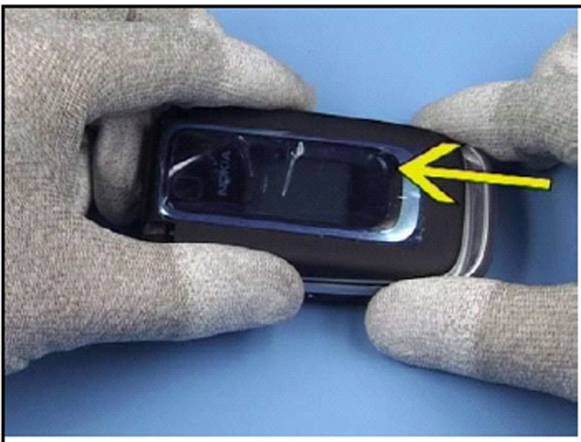
9. Gently unlock the A-COVER from the backside.



10. Now, shift along the SRT-6 to release the underneath snaps.

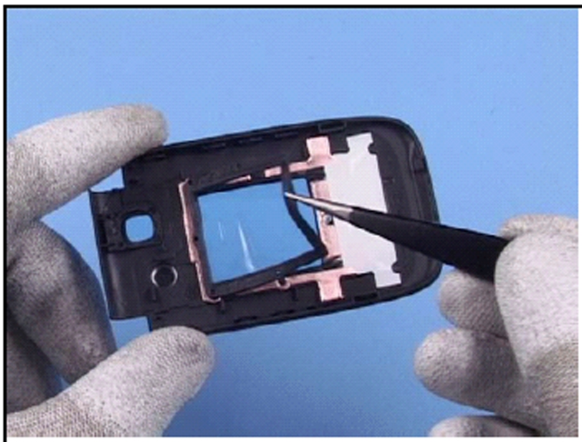


11. Do the same procedure at the long sides of the A-COVER.

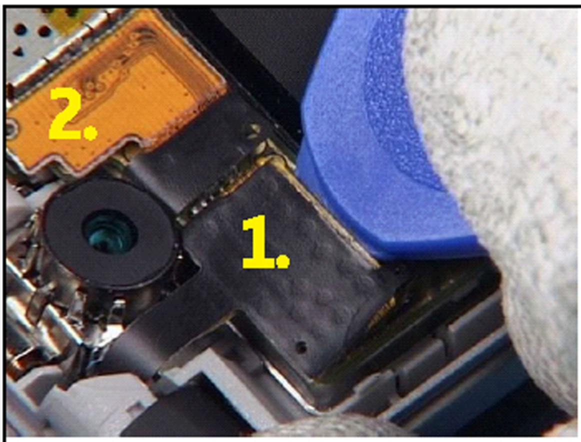


12. Now, remove the A-COVER by sliding it around 4mm to the shown direction and then lift it up.

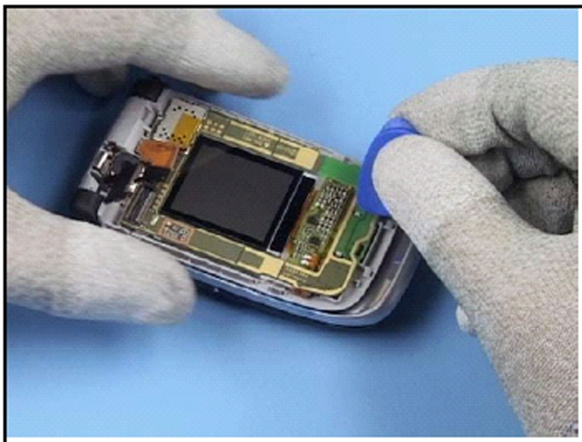
3



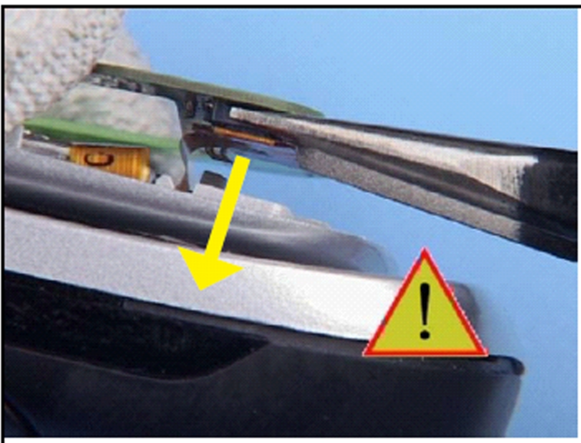
13. Take out the FRONT DISPLAY GASKET.



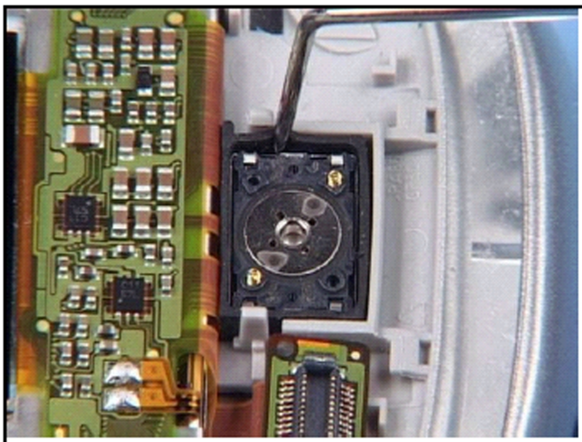
14. Carefully open the two flex connectors with the SRT-6.



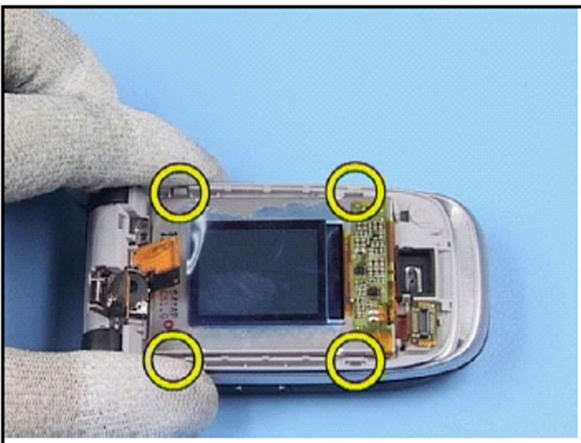
15. Release the two hooks which hold the LCD PWB into place.



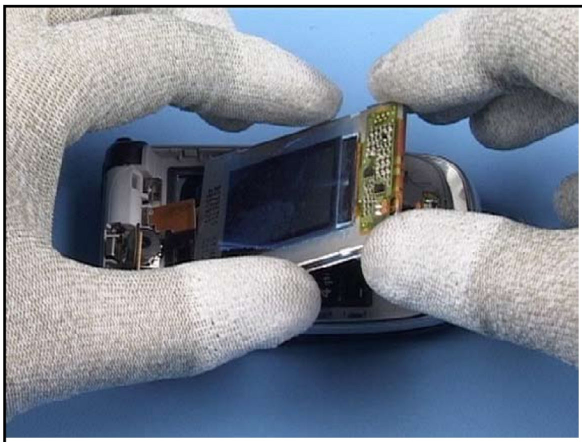
16. Lift the board only a bit and open the flex connector carefully in the shown direction.



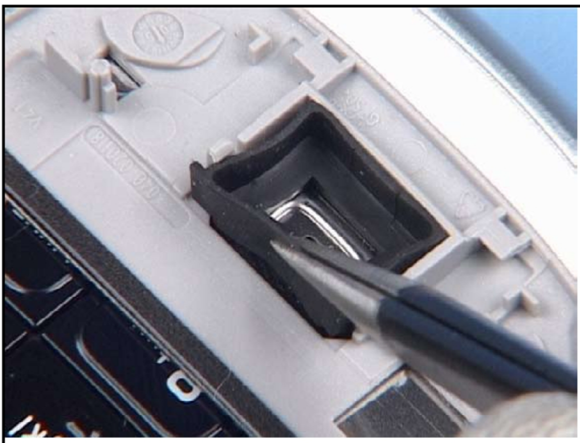
17. Ease out and remove the EARPIECE. Do not touch the spring contacts.



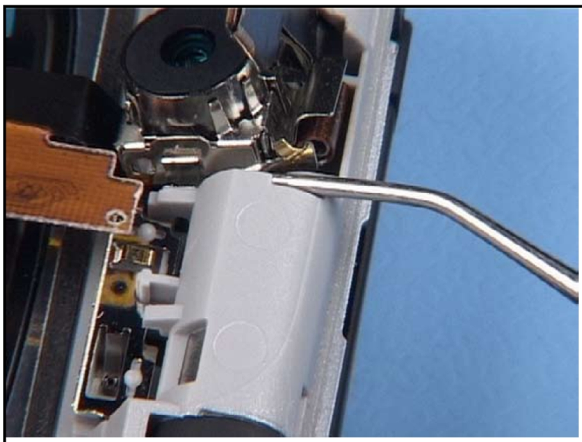
18. Unlock the four clips with hold the NAPA DISPLAY MAIN.



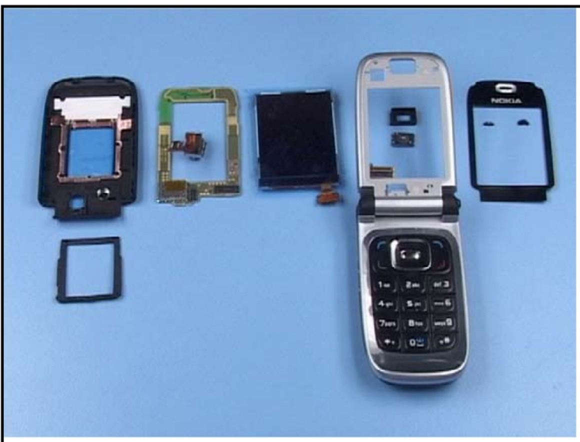
19. Now, remove the NAPA DISPLAY MAIN.



20. Remove the EARPIECE GASKET with tweezers.



21. Stick with the dental tool between the CAMERA and the B-COVER to unlock the CAMERA ASSEMBLY.

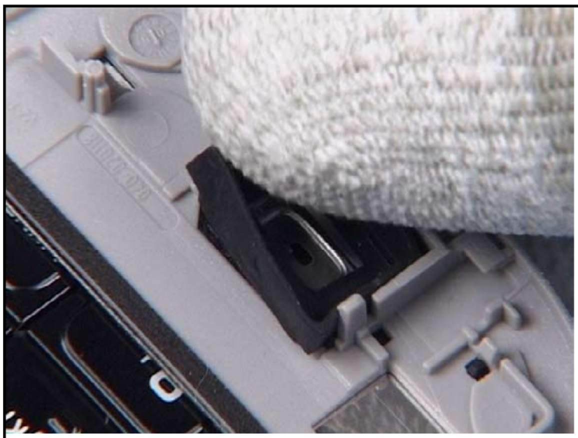
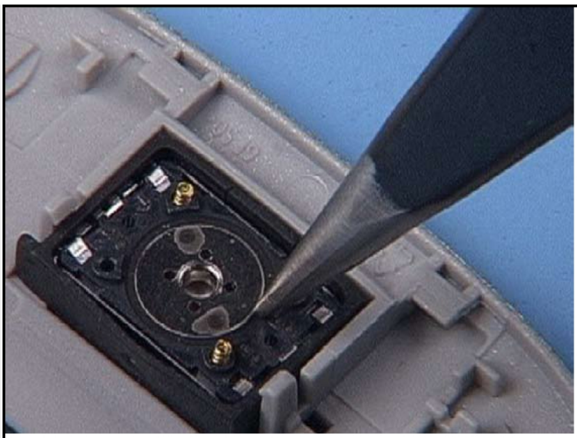
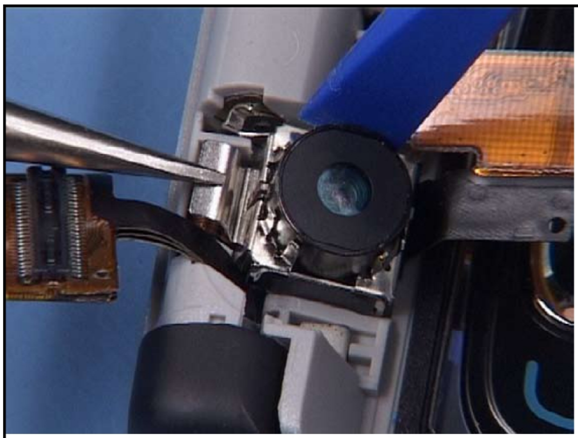
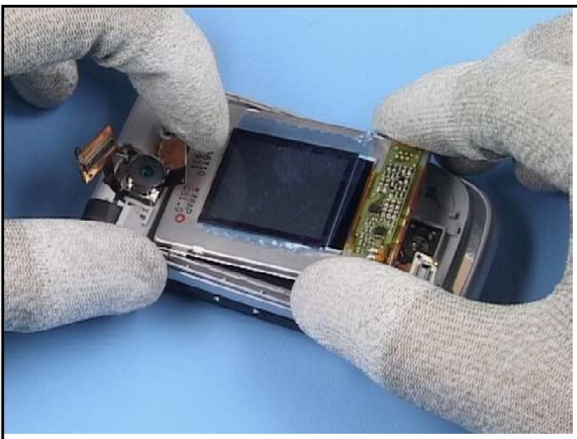
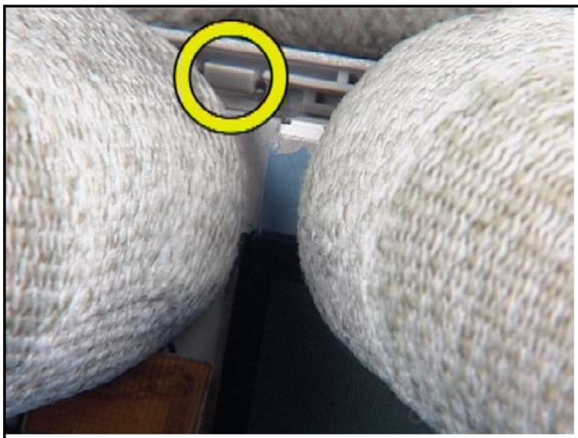
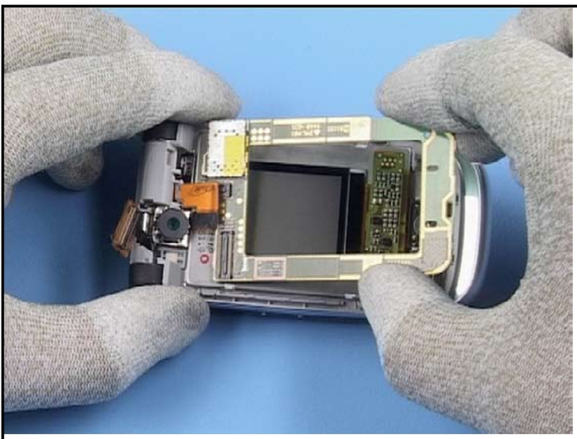


22. The disassembly procedure is now complete.

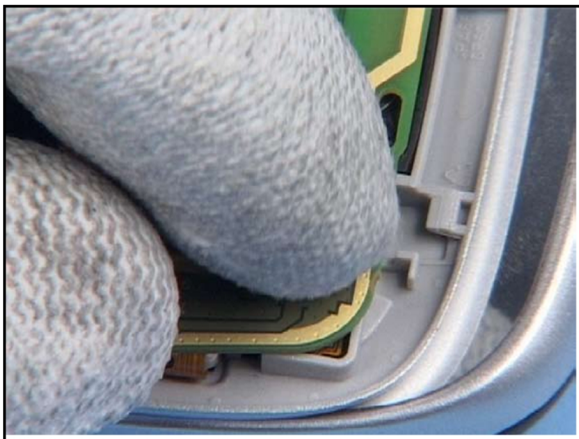
Reassembly instructions (upper block)

Steps

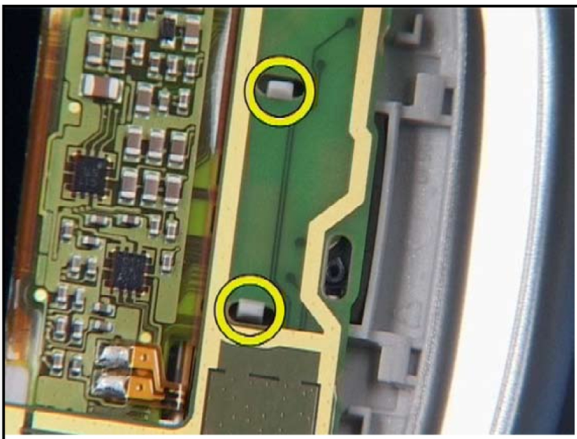
1

 1. Insert the EARPIECE GASKET properly.	 2. Ensure that the dust net is glued on the Earpiece, then place the EARPIECE evenly into the Gasket.
 3. Position the Camera Assembly into the guides of the B-COVER. Take care not to damage the board to board or camera flex foil.	 4. Put the NAPA DISPLAY Main into the B-COVER guides.
 5. Be sure to lock all the four clips of the DISPLAY. Ensure that display connector is placed properly in the correct position of the B-COVER.	 6. Place the PCD PWB and pay attention to the flex connectors.

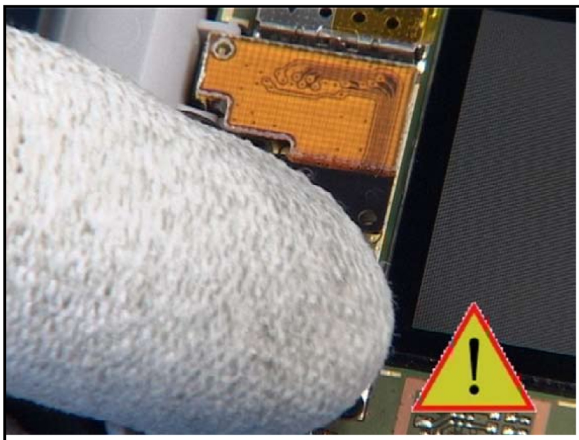
2



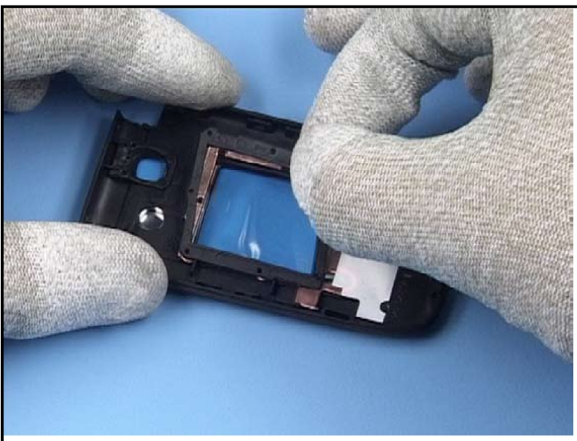
7. Properly lock the LCD connector.



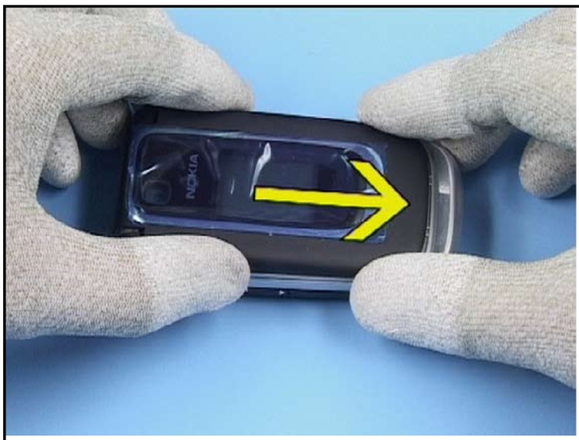
8. Check that the snaps are closed.



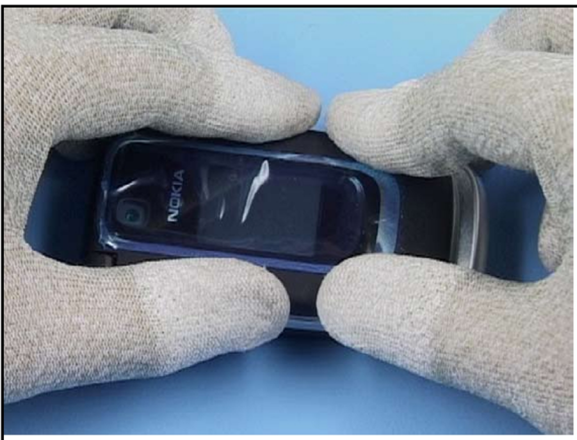
9. Carefully close the two flex connectors without touching the CAMERA.



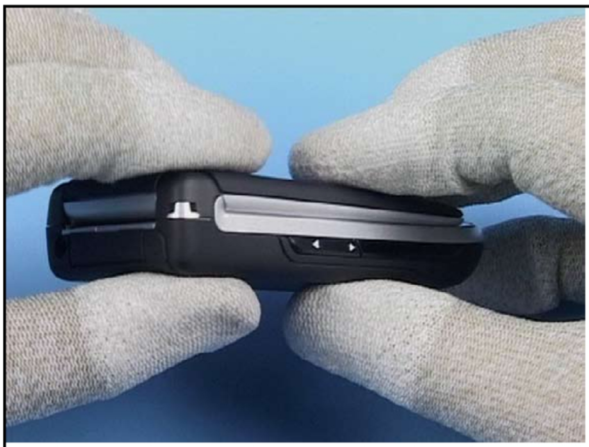
10. Put the Front DISPLAY GASKET to the A-COVER. Pay attention that all guiding pins fit to the gasket. Check also proper position of the CAMERA GASKET.



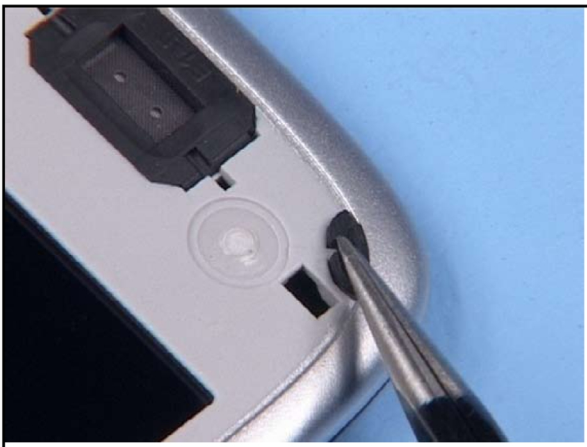
11. Put the A-COVER to the right guides first.



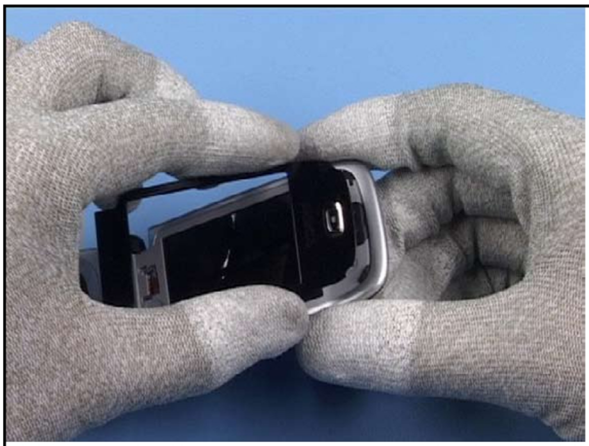
12. Then press down and lock the other underneath snaps.



13. Check that no gaps exist.



14. Place the two RUBBER STOPPERS.



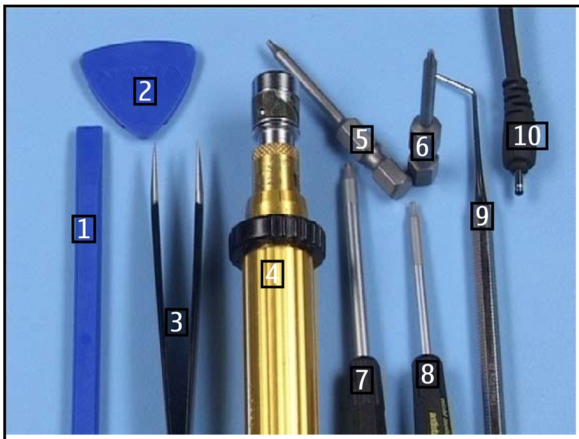
15. Exactly position the DISPLAY BEZEL. Start on the top (earpiece section) by sliding in the bezels' hooks to the B-COVER, press gently all over the bezel to ensure that whole part adhere properly.

16. The assembly procedure is now finished.

Disassembly instructions (lower block)

Steps

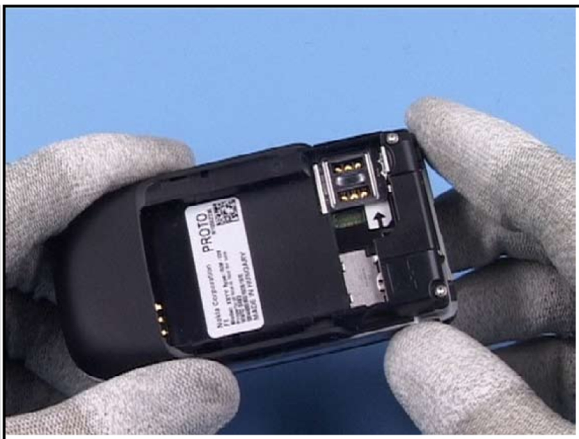
1



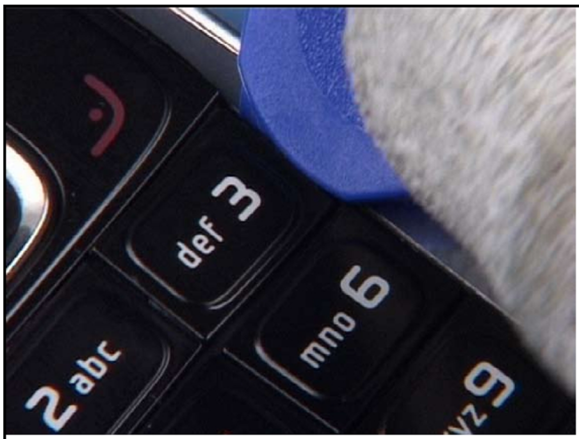
1. Needed tools: 1. SS-93, 2. SRT-6, Metal tweezers, 4. Torque driver, 5. Torx plus size 5 bit, 6. Torx plus size 6 bit, 7. Torx plus driver size 6, 8. Torx plus driver size 5, 9. Dental pick and 10. DC-Plug.

2. Note that all windows are covered with protection film.

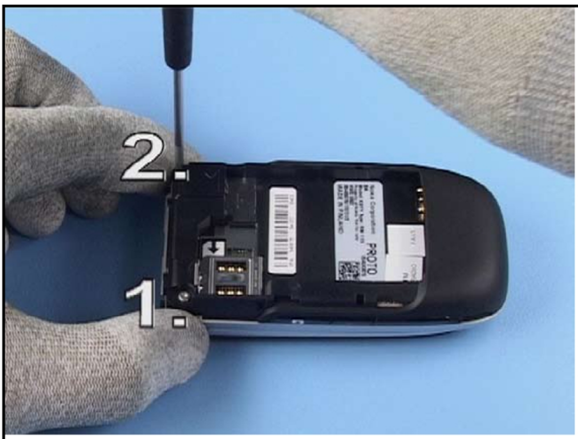
3. Unlock and remove the E-COVER.



4. Check that there is no SIM or SD card still inserted before continuing.

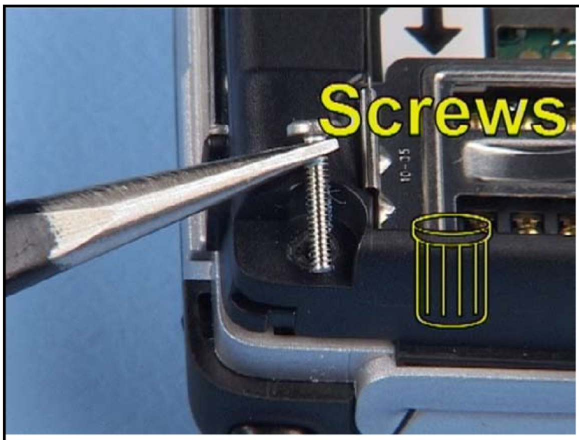


5. Carefully pry open the KEYMAT with SRT-6 at key 3.

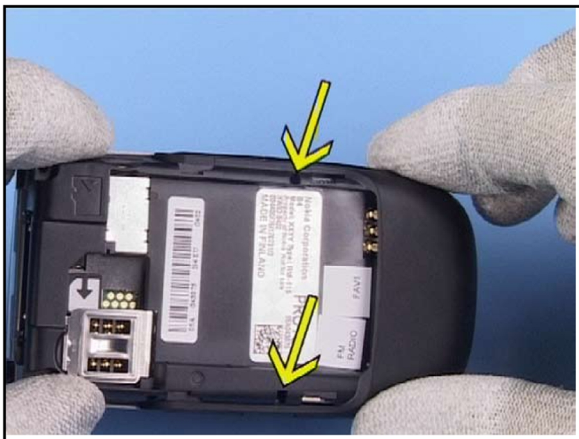


6. Undo both screws in the order shown and discard them.

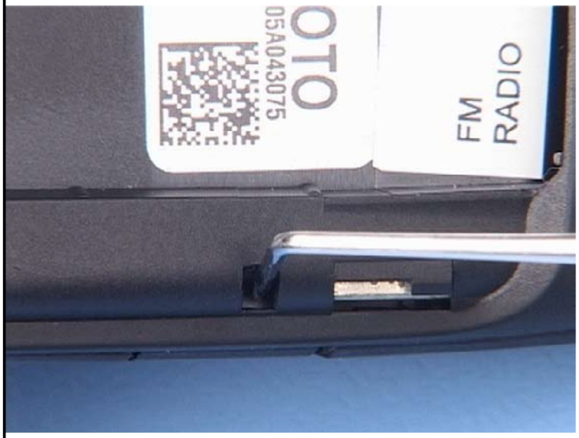
2



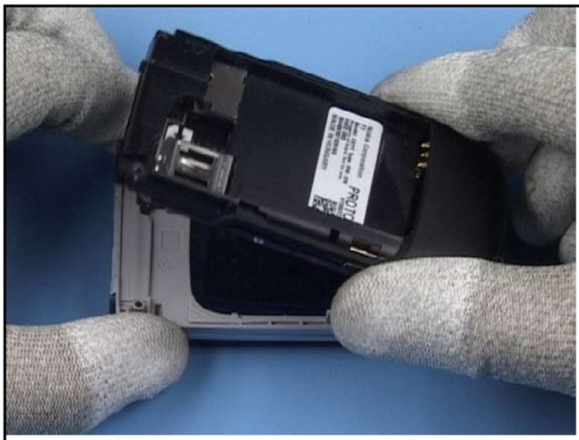
7. These screws are covered with locking compound and can’t be reused again.



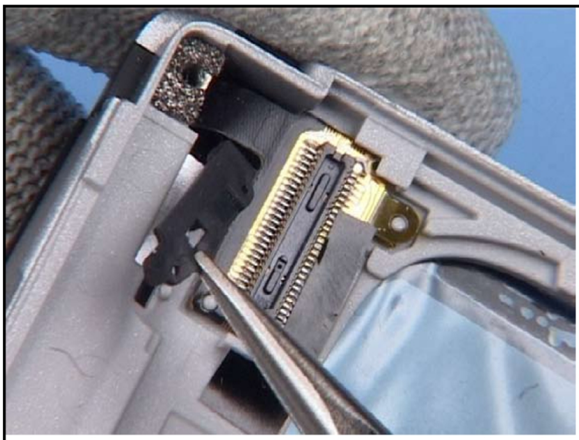
8. Hold the assembly as shown. Locate the 2 holes in the D-COVER.



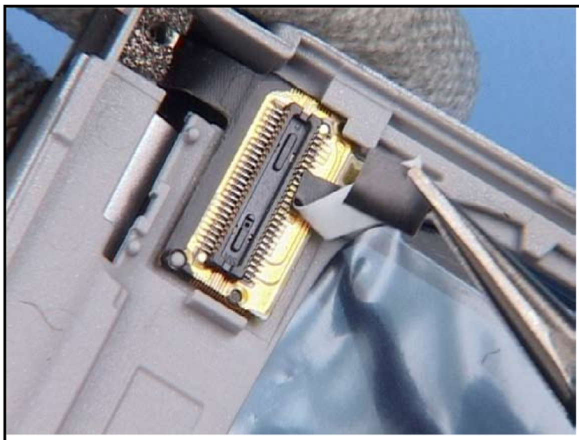
9. Use the dental pick to unlock the clips at both sides.



10. Separate the covers.

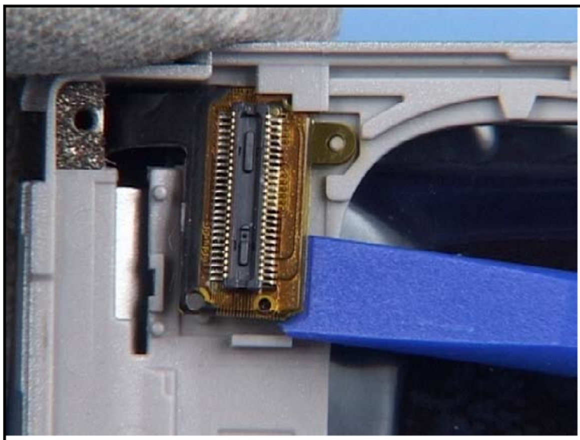


11. Remove the MIC-RUBBER with tweezers.

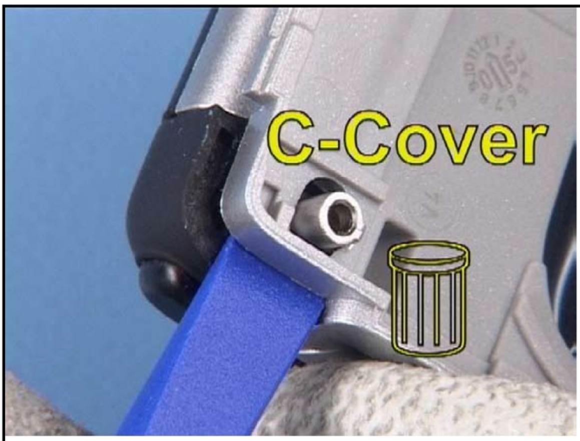


12. Peel up the L-ADHESIVE FOAM.

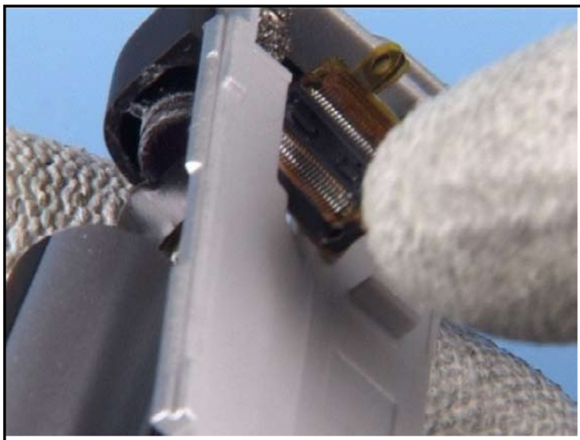
3



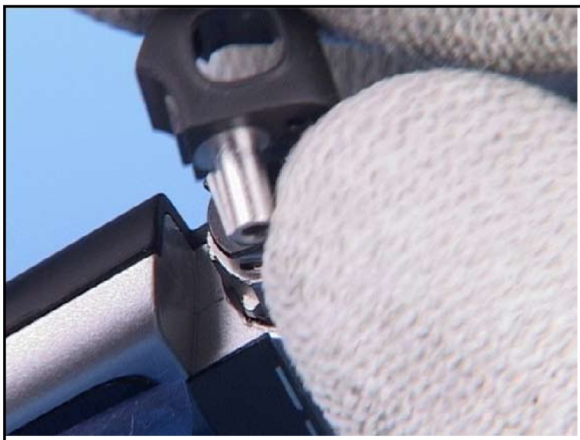
13. Release the FLEX FOIL connector with the SS-93.



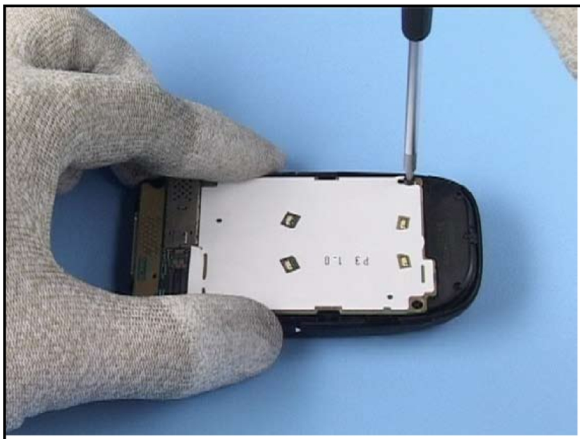
14. Loosen the C-COVER from the HINGE, also using the SS-93.



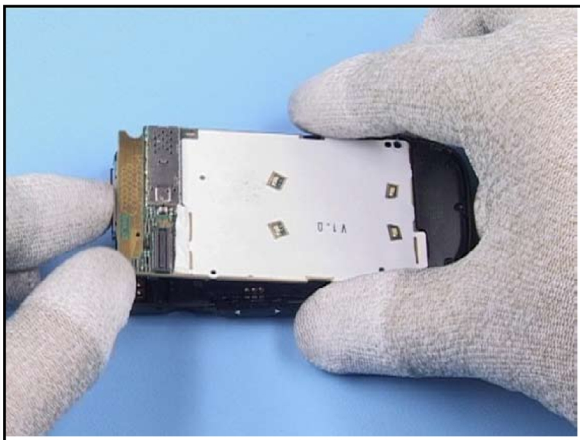
15. Carefully separate the C-COVER from the Upper Block and carefully slot the flex connector through the C-COVER. Always use a new C-COVER.



16. Remove the HINGE CAP RIGHT and then the Push to Open Button.

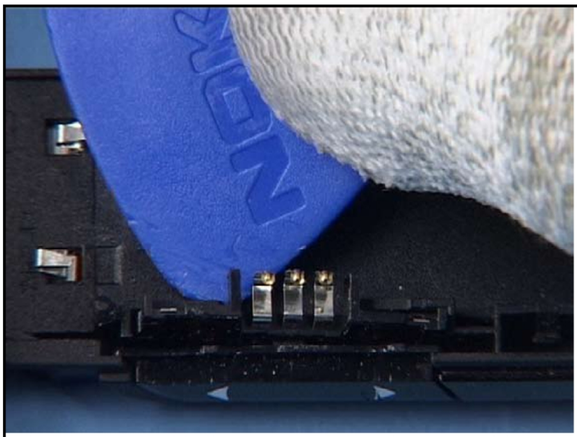


17. Undo the Torx Plus size 6 screw.

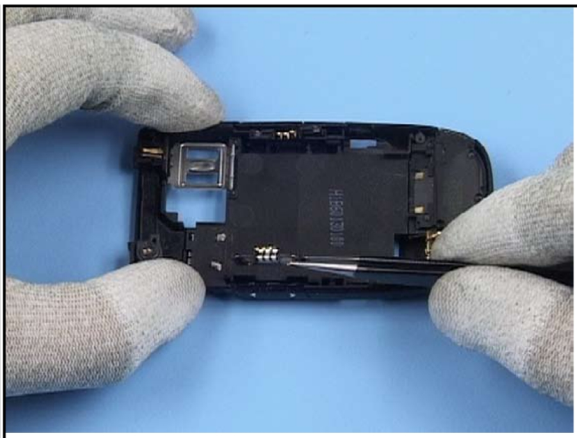


18. Lift out the PWB.

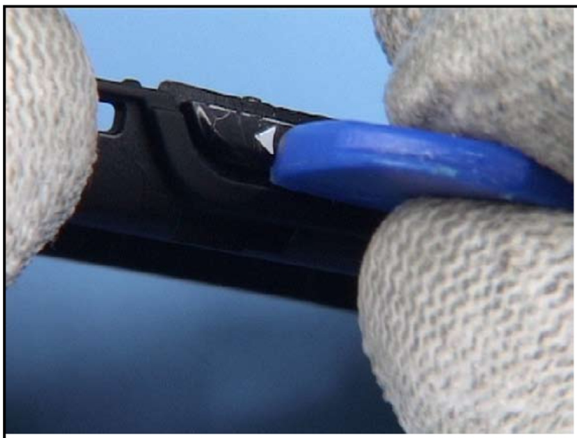
4



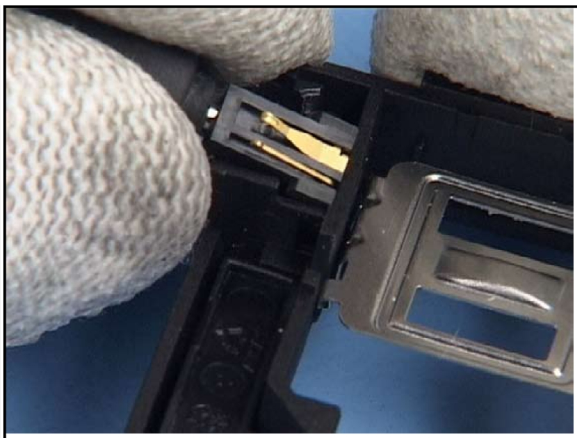
19. Loosen the VOLUME KEY and on the opposite side the FUNCTION/POWER KEY with SRT-6. Take care not to bend the springs.



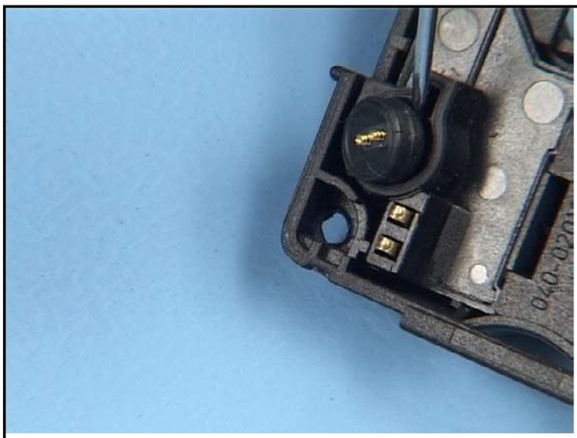
20. Remove the VOLUME KEY and on the opposite side the FUNCTION/POWER KEY with tweezers. Take care not to bend the springs.



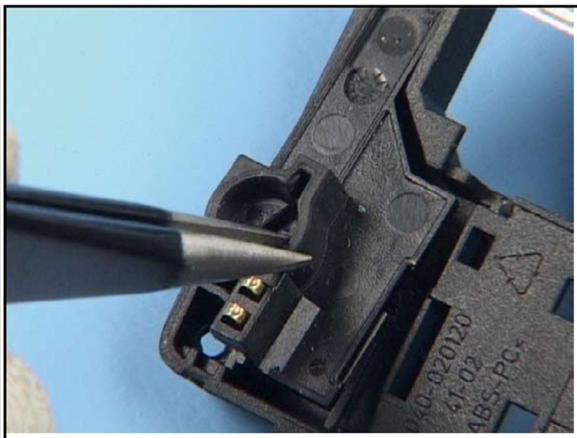
21. Release all buttons with the SRT-6 as shown.



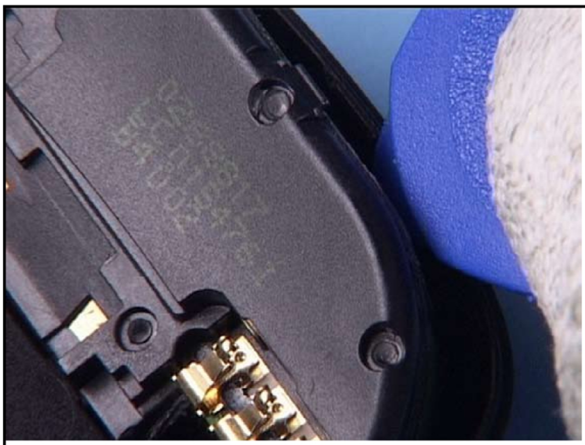
22. Remove the DC JACK with the DC Plug.



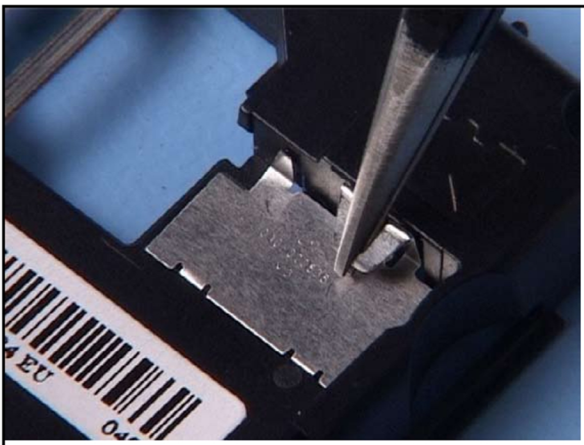
23. Ease out the MICROPHONE and remove it with tweezers. Do not touch the springs.



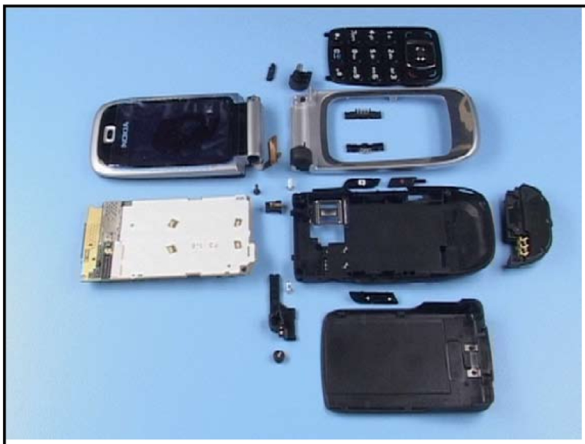
24. Remove the BLUETOOTH ANTENNA with tweezers.



25. The ANTENNA ASSY can be released with the SRT-6 easily.



26. Use the tweezers to unlock the BATTERY SPRING.

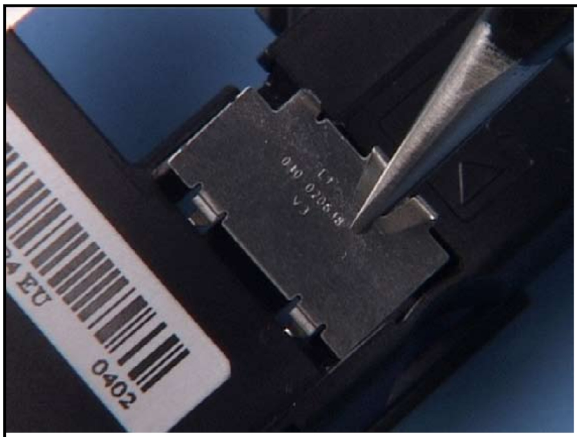


27. The disassembly procedure is now complete.

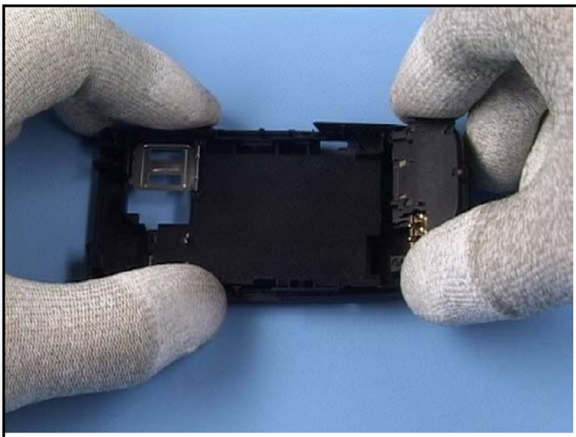
Reassembly instructions (lower block)

Steps

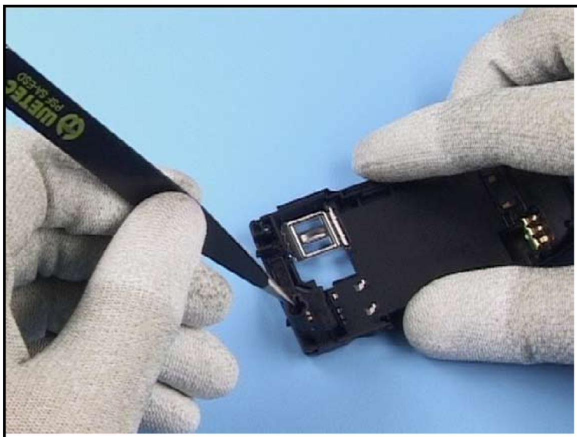
1



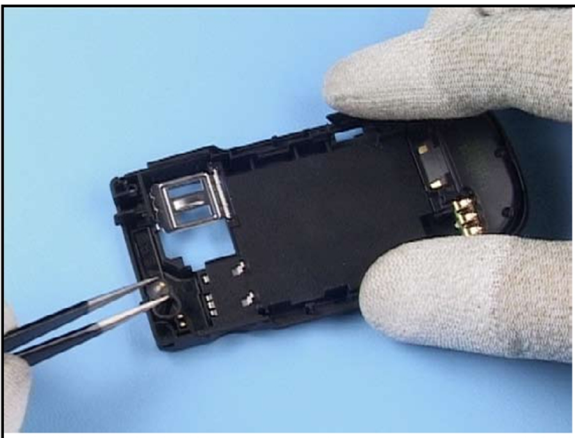
1. Insert the BATTERY SPRING and click it into its place.



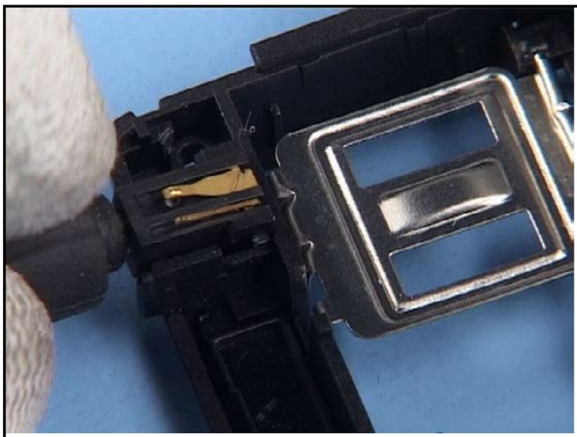
2. Insert the ANTENNA MODULE into its compartment.



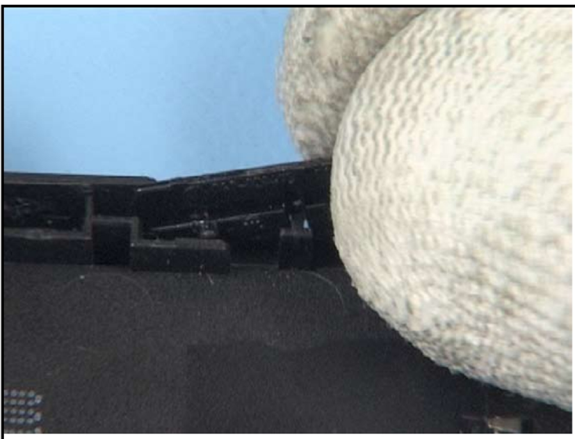
3. Place the BLUETOOTH ANTENNA.



4. Carefully insert the MICROPHONE into its compartment.

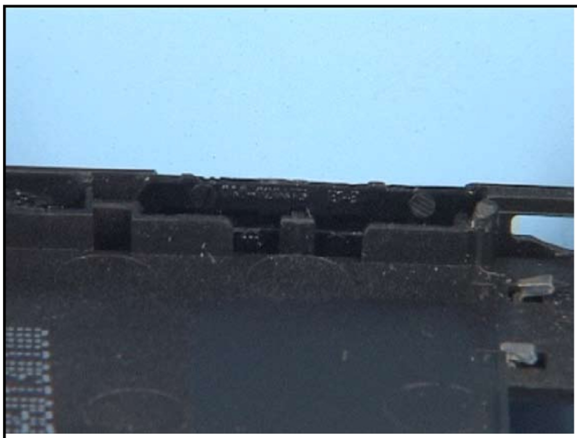


5. Use the DC Plug to reassemble the DC JACK.

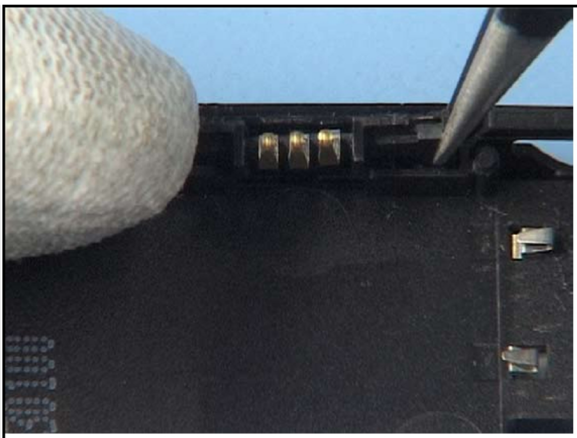


6. Insert the Buttons and lock them with your fingers.

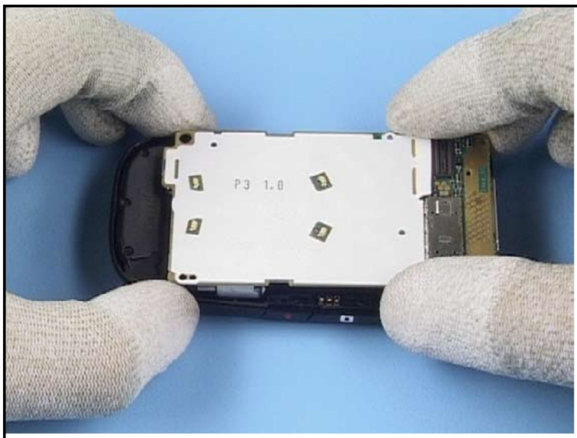
2



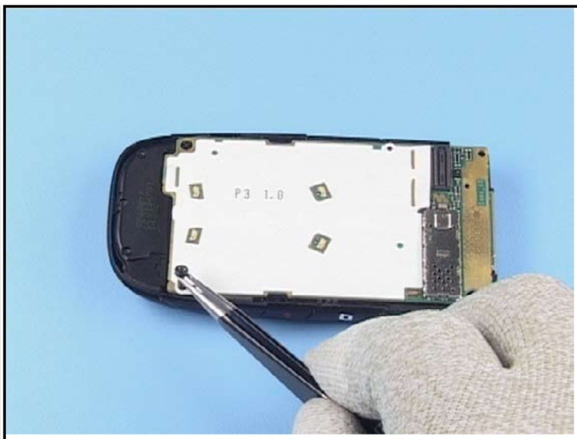
7. Check the correct positioning of the keys before continuing.



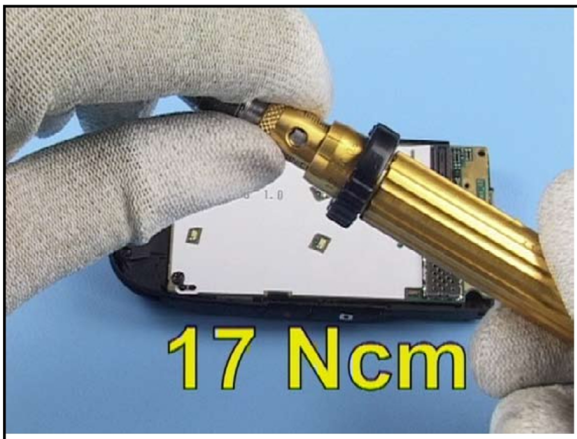
8. Now insert the VOLUME KEY and on the opposite side the FUNCTION/POWER KEY. Take special care not to bend the spring contacts.



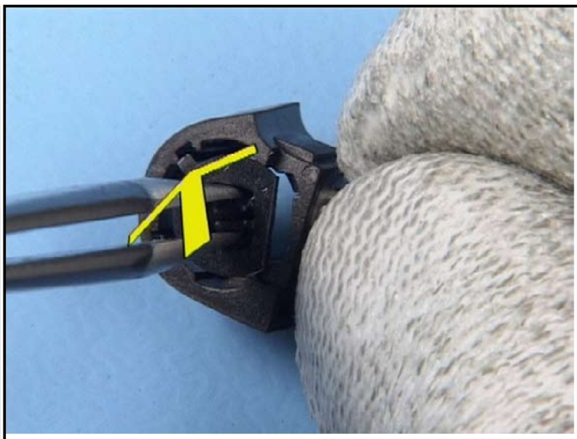
9. Place the ENGINE BOARD into the D-COVER.



10. Insert the board screw with tweezers.

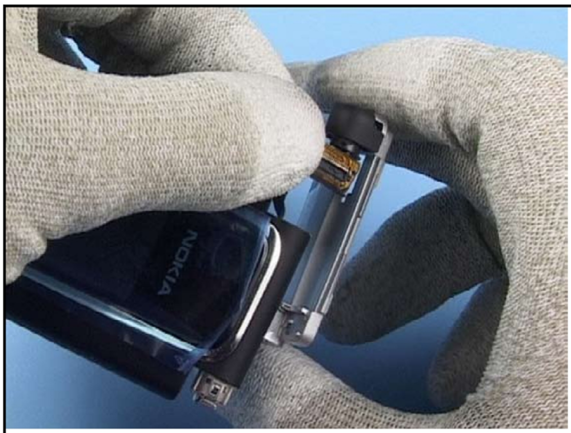


11. Set the correct torque and tighten in.

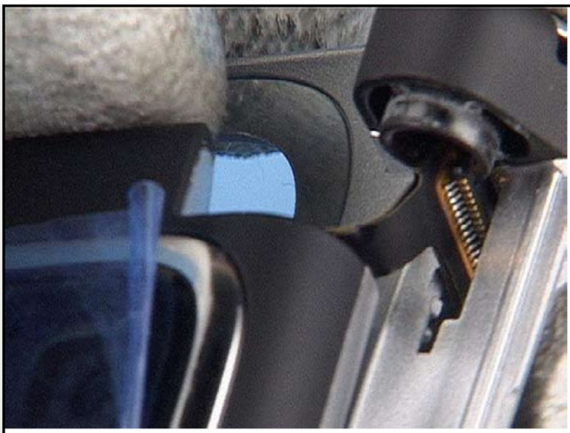


12. Place the Push to Open Button into the HINGE CAP RIGHT.

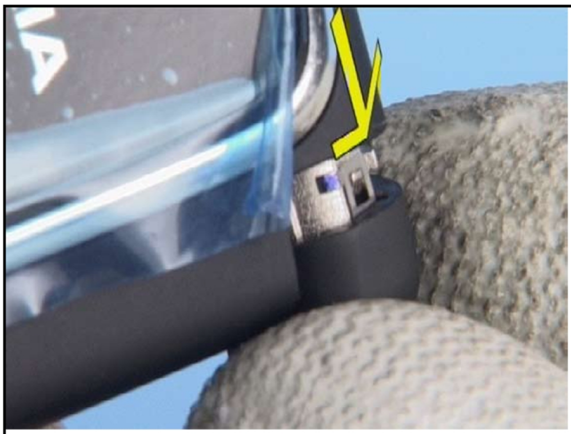
3.



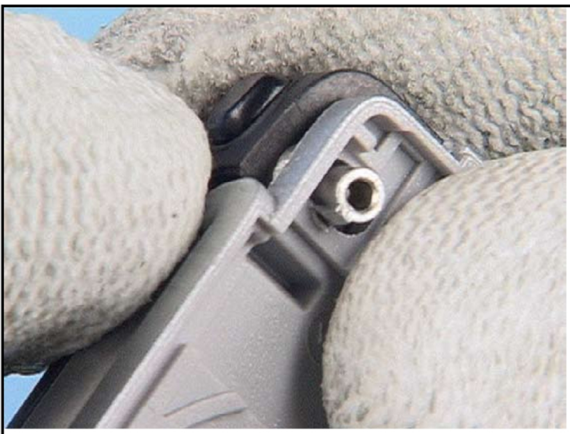
13. Slot the flex connector through the D-COVER with caution.



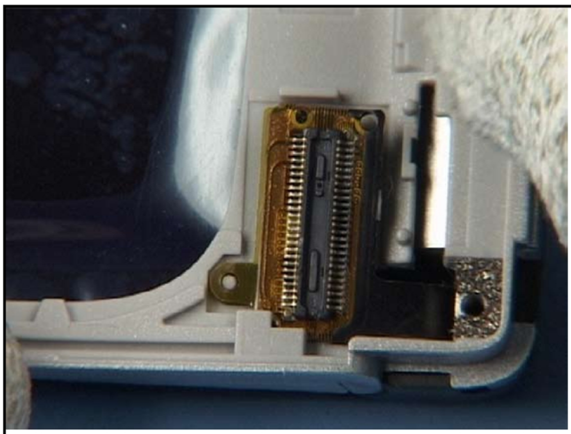
14. Be sure not to squash the FLEX FOIL when assembling the HINGE.



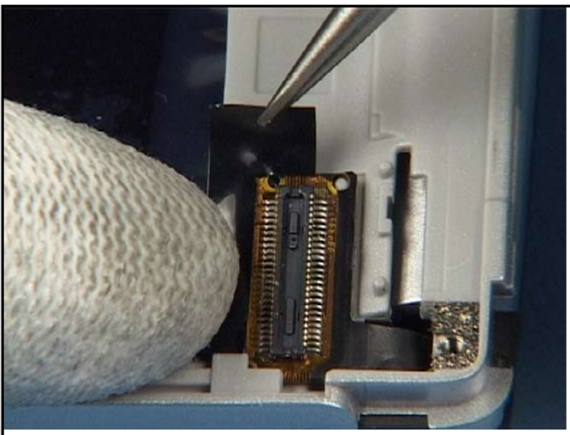
15. Only one position is possible for the HINGE CAP RIGHT assembly.



16. Squeeze together the HINGE CAP RIGHT and the new C-COVER. Ensure both hinges are pressed into C-COVER correctly.

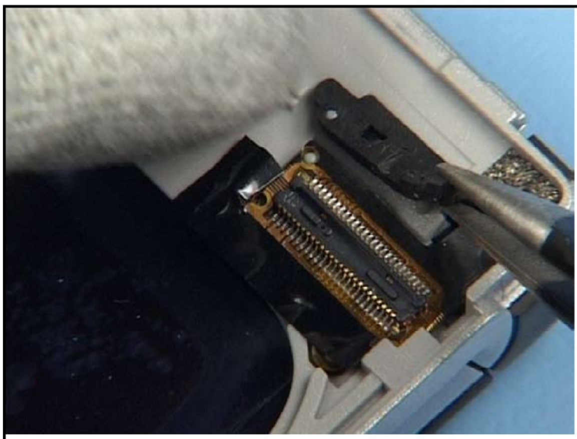


17. Position the flex connector onto its guide pins.

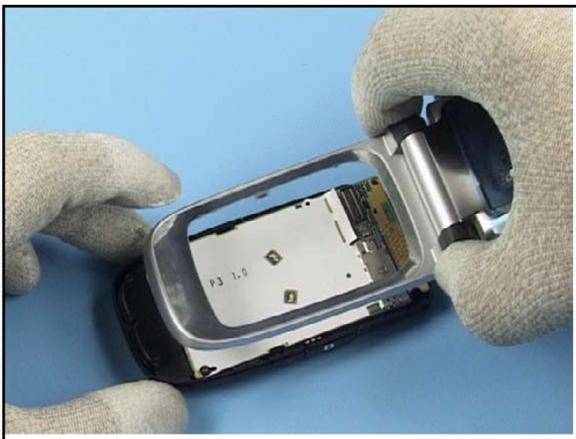


18. Attach the connector with the L-ADHESIVE FOAM. Ensure that the L-ADHESIVE FOAM is placed correctly, not covering the contact area and leaving enough space for closing the connector properly.

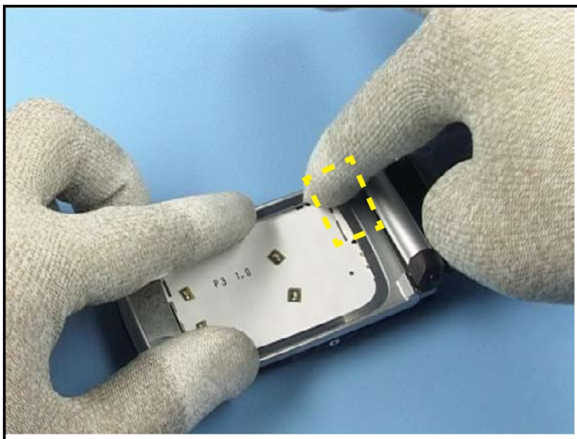
4



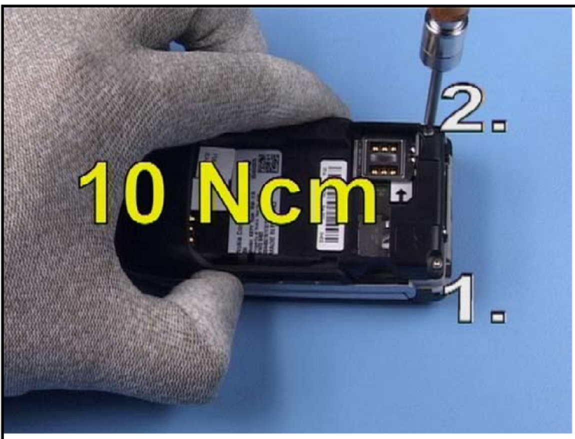
19. Place the MIC RUBBER.



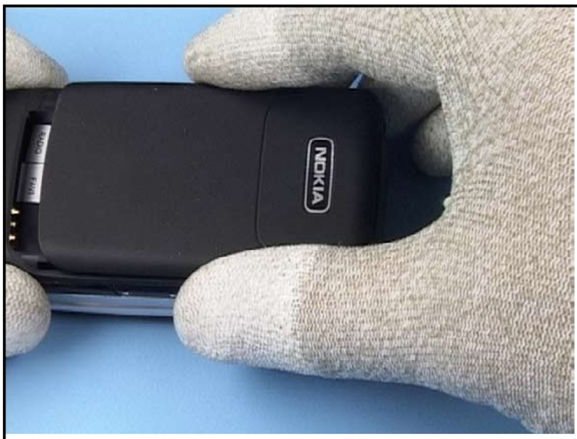
20. Open B-C.COVER by pressing the release button, then mount the C-COVER with the Upper Block onto the D-COVER.



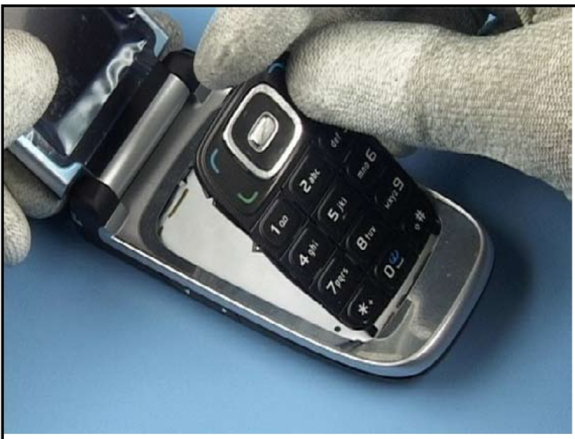
21. Press onto the shown area to lock the connector properly. A “click” noise can be heard when pressing on the C-COVER.



22. Close the unit, turn it upside-down and fasten the two screws in the order shown. Check C-D cover for gaps (especially in the antenna area), to ensure that it is properly closed.



23. Mount the E-COVER and close the Flap.



24. Finally, assemble the KEYMAT, starting from the lower side.

25. Make sure that it fits correctly.

26. Check all windows for cleanliness.

(This page left intentionally blank.)

6 — BB Troubleshooting and Manual Tuning Guide

(This page left intentionally blank.)

Table of Contents

Baseband troubleshooting overview....6–5
Power and charging troubleshooting....6–6
  General power checking troubleshooting....6–6
  Battery current measuring fault troubleshooting....6–7
  Charging troubleshooting....6–8
  Clocking troubleshooting....6–9
Interface troubleshooting....6–10
  Camera failure....6–10
    Introduction to camera troubleshooting....6–10
    Taking and evaluating test pictures....6–10
    Camera hardware failure message troubleshooting....6–11
    Camera hardware troubleshooting....6–12
    Camera viewfinder troubleshooting....6–13
    Camera: Bad image quality troubleshooting....6–14
  COMBO memory troubleshooting....6–15
  Flash programming fault troubleshooting....6–16
  FM radio troubleshooting....6–17
  SD card troubleshooting....6–19
User interface troubleshooting....6–20
  Display module troubleshooting....6–20
    General instructions for display troubleshooting....6–20
    Display troubleshooting....6–22
  Backlight troubleshooting....6–23
  LED driver troubleshooting....6–24
  Fold switch/Hall sensor troubleshooting....6–25
Audio troubleshooting....6–25
  Introduction to acoustics troubleshooting....6–25
  Audio troubleshooting test instructions....6–26
  Earpiece troubleshooting....6–29
  Internal earpiece troubleshooting....6–30
  External headset earpiece troubleshooting....6–31
  IHF troubleshooting....6–32
  IHF troubleshooting....6–33
  Microphone troubleshooting....6–34
  Internal microphone troubleshooting....6–35
  External headset microphone troubleshooting....6–36
  HAC troubleshooting....6–37
Connections troubleshooting....6–38
  Bluetooth troubleshooting....6–38
    Introduction to Bluetooth troubleshooting....6–38
    Bluetooth settings for Phoenix....6–38
    Bluetooth self tests in Phoenix....6–39
    Bluetooth BER failure troubleshooting....6–40
    Bluetooth audio and UI activation troubleshooting....6–43
  IrDA troubleshooting....6–43
  USB troubleshooting....6–45
Baseband manual tuning guide....6–46
  Certificate restoring for BB5.0 products....6–46
  Energy management calibration....6–51

List of Tables

Table 10 Display module troubleshooting cases......6–20
Table 11 Pixel defects......6–21
Table 12 Calibration value limits......6–51

List of Figures

Figure 36 Flashing pic 1. Take single trig measurement for the rise of the BSI signal......6–17
Figure 37 Flashing pic 2. Take single trig measurement for the rise of the BSI signal......6–17
Figure 38 SD card initialization from pin J3206......6–20
Figure 39 Single-ended output waveform of the Ext_in_HP_out measurement when earpiece is connected......6–28
Figure 40 Differential output waveform of the Ext_in_IHF_out out loop measurement when speaker is connected......6–28
Figure 41 Single-ended output waveform of the HP_in_Ext_out loop when microphone is connected.... 6–28
Figure 42 BER test result......6–39
Figure 43 Bluetooth self tests in Phoenix......6–40

Baseband troubleshooting overview

This section is intended to be a guide for localising and repairing electrical faults.

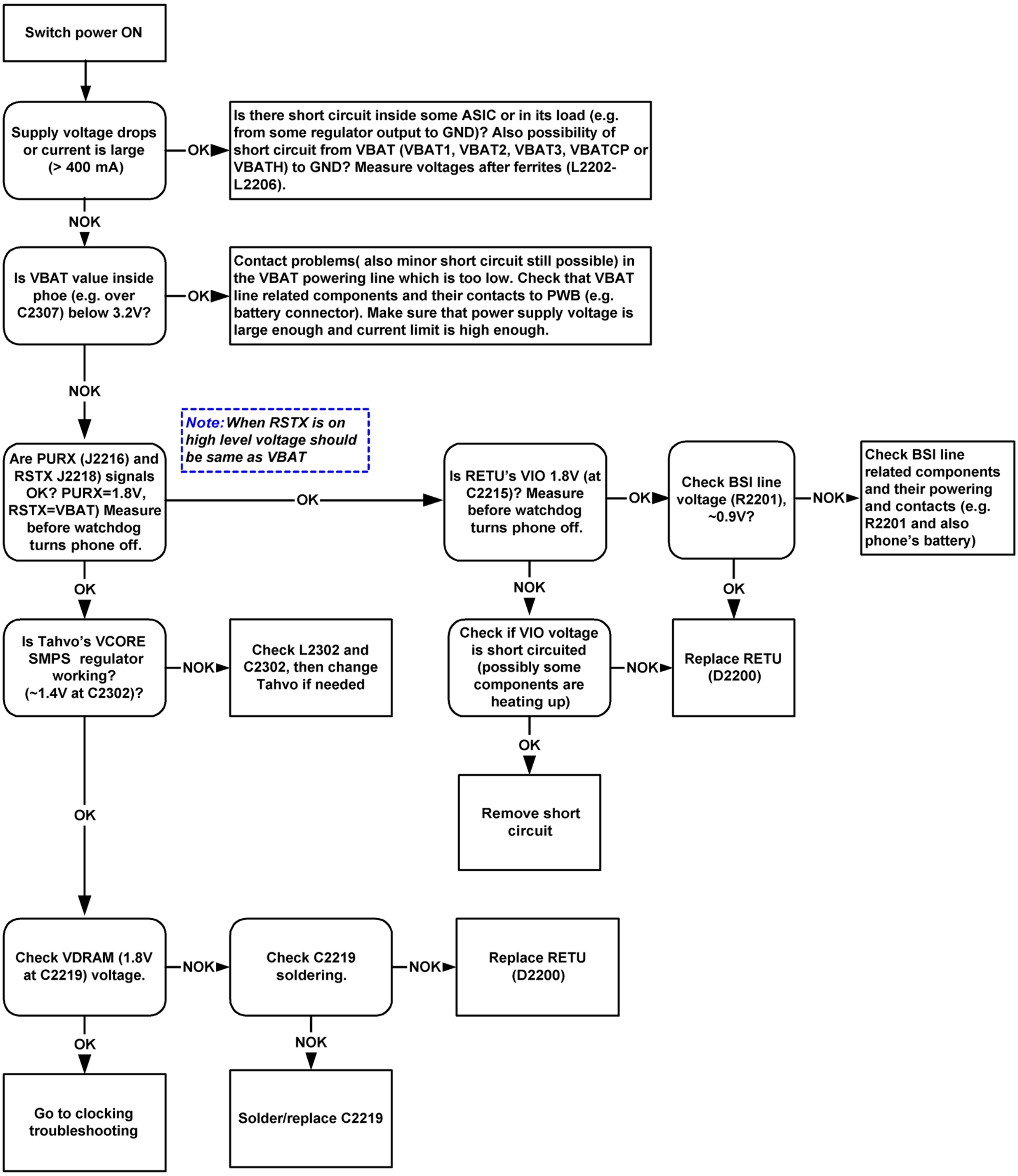
The table below tells you what troubleshooting to go to.

Problem	Troubleshooting
Abnormal current consumption	1 General power checking (page 6–6) 2 Battery current measuring fault (page 6–7)
Flashing does not work or the problem is not clearly defined	1 Flashing (page 6–16) 2 Clocking (page 6–9) 3 Combo memory (page 6–15)
Charging does not work	Charging (page 6–8)
Display does not work	Display fault (page 6–22)
Backlights do not work	1 Backlight (page 6–23) 2 LED driver (page 6–24)
USB does not work	USB (page 6–45)
Audio (mic, earpiece, IHF) does not work	1 Audio (page 6–26) 2 Acoustics (page)
Hearing aid compatibility (HAC) **Note:** HAC is not supported by all variants!	HAC (page 6–37)
Camera does not work	1 Camera hardware failure message (page 6–11) 2 Camera baseband hardware (page 6–12) 3 Camera viewfinder (page 6–13) 4 Bad image quality (page 6–14)
Fold switch/Hall sensor detection	Hall sensor (page 6–25)
Bluetooth does not work	Bluetooth (BT) (page 6–38)
FM radio does not work **Note:** FM radio is not supported by all variants!	FM radio (page 6–17)
Infrared communication (IrDa) **Note:** IrDa is not supported by all variants!	IrDa (page 6–43)
µSD MMC card	SD card (page 6–19)

Power and charging troubleshooting

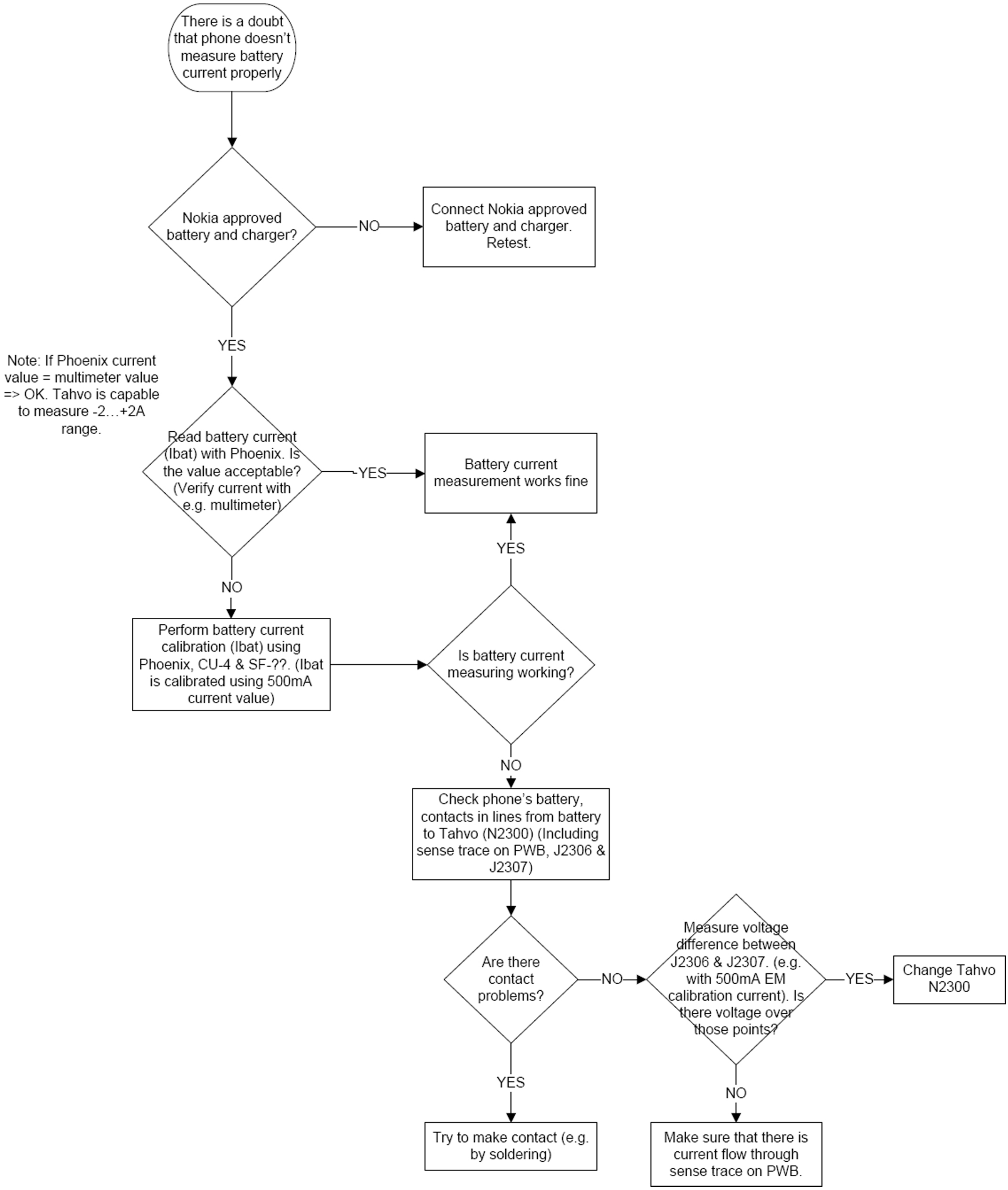
General power checking troubleshooting

Troubleshooting flow


Switch power ON
Supply voltage drops or current is large (> 400 mA)
OK
Is there short circuit inside some ASIC or in its load (e.g. from some regulator output to GND)? Also possibility of short circuit from VBAT (VBAT1, VBAT2, VBAT3, VBATCP or VBATH) to GND? Measure voltages after ferrites (L2202-L2206).
NOK
Is VBAT value inside phoe (e.g. over C2307) below 3.2V?
OK
Contact problems(also minor short circuit still possible) in the VBAT powering line which is too low. Check that VBAT line related components and their contacts to PWB (e.g. battery connector). Make sure that power supply voltage is large enough and current limit is high enough.
NOK
Note: When RSTX is on high level voltage should be same as VBAT
Are PURX (J2216) and RSTX J2218) signals OK? PURX=1.8V, RSTX=VBAT) Measure before watchdog turns phone off.
OK
Is RETU's VIO 1.8V (at C2215)? Measure before watchdog turns phone off.
OK
Check BSI line voltage (R2201), ~0.9V?
NOK
Check BSI line related components and their powering and contacts (e.g. R2201 and also phone's battery)
OK
Replace RETU (D2200)
NOK
Check if VIO voltage is short circuited (possibly some components are heating up)
NOK
OK
Remove short circuit
OK
Is Tahvo's VCORE SMPS regulator working? (~1.4V at C2302)?
NOK
Check L2302 and C2302, then change Tahvo if needed
OK
Check VDRAM (1.8V at C2219) voltage.
NOK
Check C2219 soldering.
NOK
Replace RETU (D2200)
OK
Go to clocking troubleshooting
NOK
Solder/replace C2219

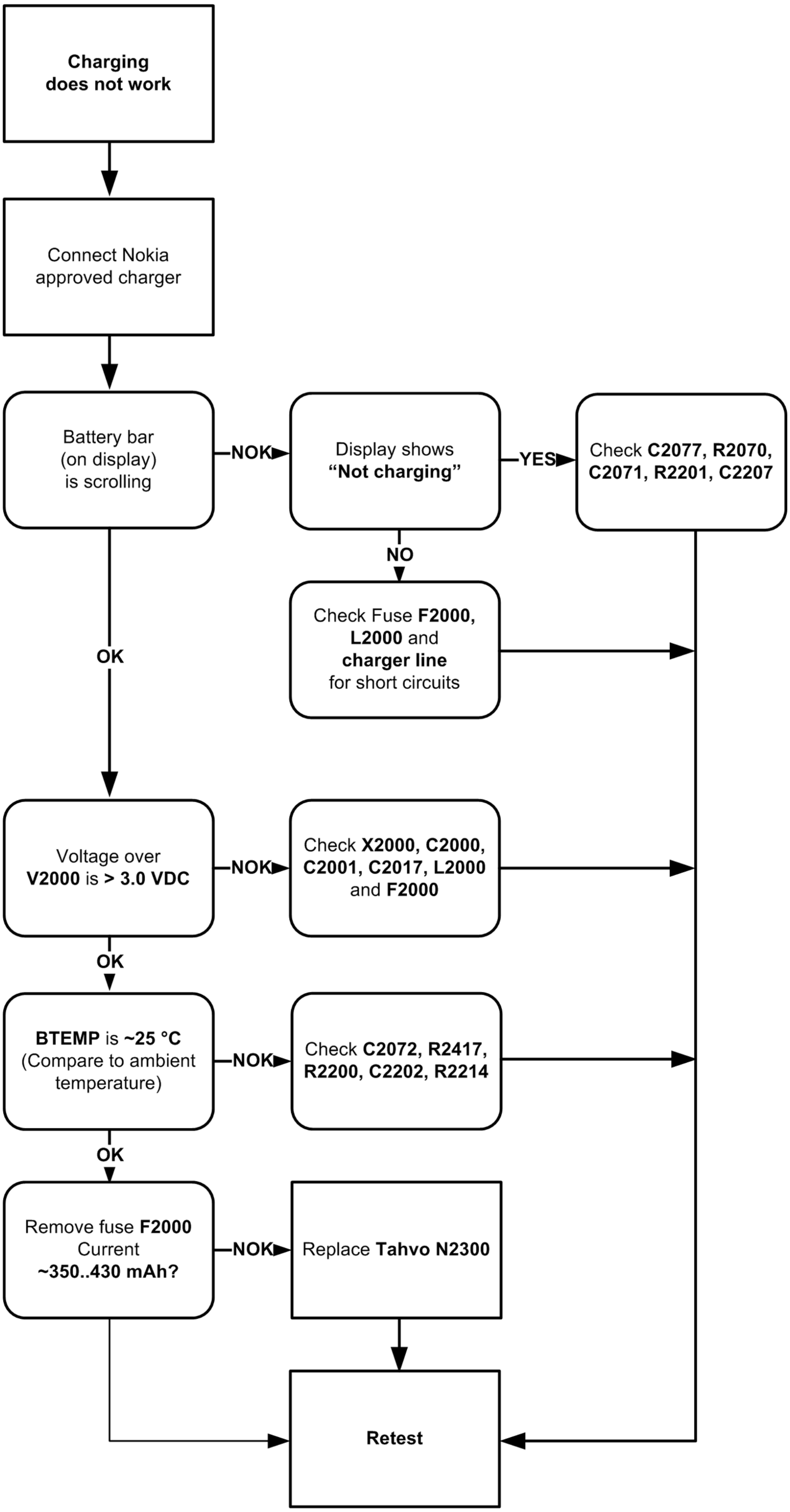
Battery current measuring fault troubleshooting

Troubleshooting flow


There is a doubt that phone doesn't measure battery current properly
Nokia approved battery and charger?
NO
Connect Nokia approved battery and charger. Retest.
YES
Note: If Phoenix current value = multimeter value => OK. Tahvo is capable to measure -2…+2A range.
Read battery current (Ibat) with Phoenix. Is the value acceptable? (Verify current with e.g. multimeter)
YES
Battery current measurement works fine
NO
Perform battery current calibration (Ibat) using Phoenix, CU-4 & SF-??. (Ibat is calibrated using 500mA current value)
YES
Is battery current measuring working?
NO
Check phone's battery, contacts in lines from battery to Tahvo (N2300) (Including sense trace on PWB, J2306 & J2307)
Are there contact problems?
NO
Measure voltage difference between J2306 & J2307. (e.g. with 500mA EM calibration current). Is there voltage over those points?
YES
Change Tahvo N2300
YES
Try to make contact (e.g. by soldering)
NO
Make sure that there is current flow through sense trace on PWB.

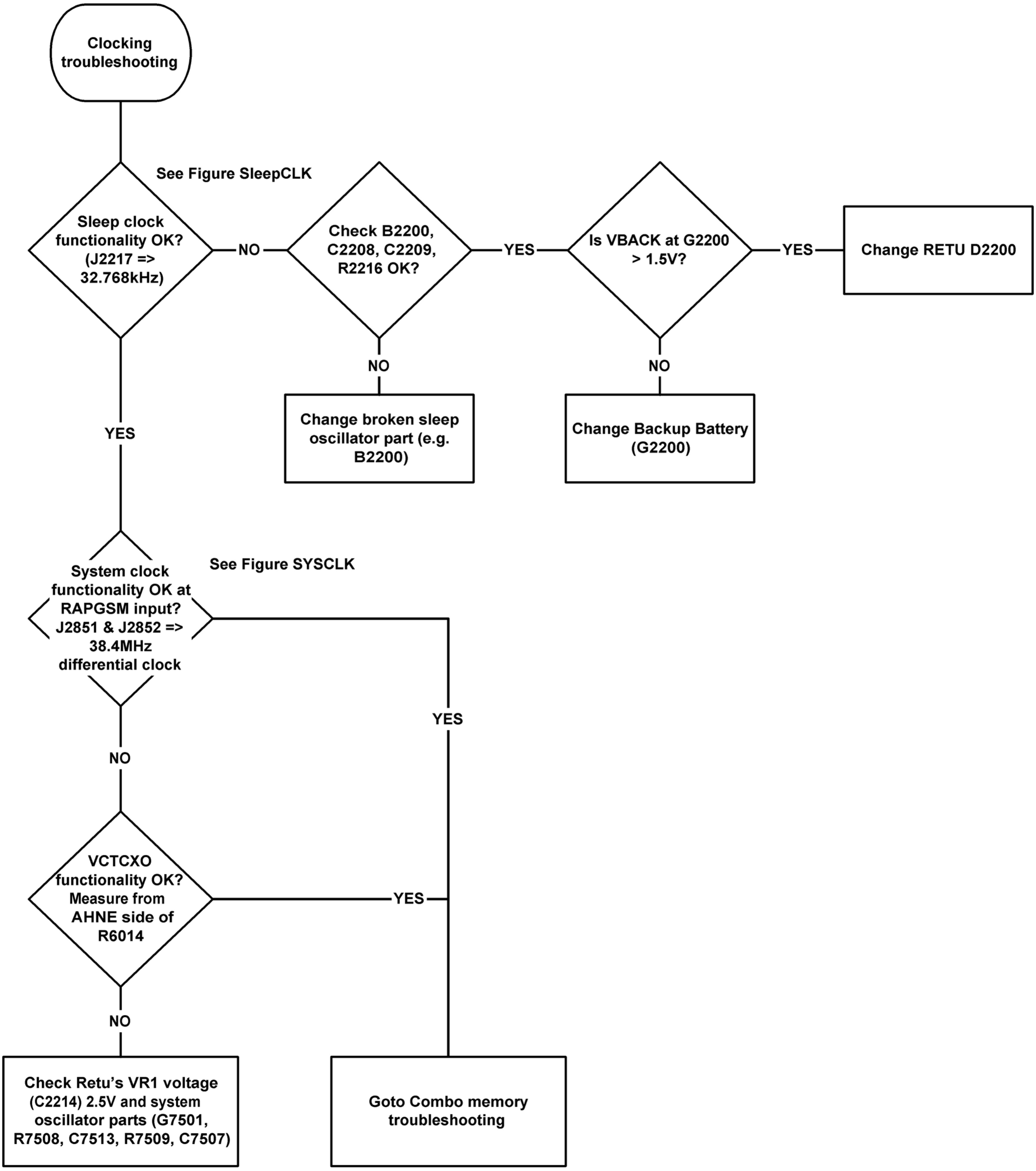
Charging troubleshooting

Troubleshooting flow


Charging does not work
Connect Nokia approved charger
Battery bar (on display) is scrolling
NOK
Display shows "Not charging"
YES
Check C2077, R2070, C2071, R2201, C2207
NO
Check Fuse F2000, L2000 and charger line for short circuits
OK
Voltage over V2000 is > 3.0 VDC
NOK
Check X2000, C2000, C2001, C2017, L2000 and F2000
OK
BTEMP is ~25 °C (Compare to ambient temperature)
NOK
Check C2072, R2417, R2200, C2202, R2214
OK
Remove fuse F2000 Current ~350..430 mAh?
NOK
Replace Tahvo N2300
Retest

Clocking troubleshooting

Troubleshooting flow


Clocking troubleshooting
See Figure SleepCLK
Sleep clock functionality OK? (J2217 => 32.768kHz)
NO
Check B2200, C2208, C2209, R2216 OK?
YES
Is VBACK at G2200 > 1.5V?
YES
Change RETU D2200
NO
Change broken sleep oscillator part (e.g. B2200)
NO
Change Backup Battery (G2200)
YES
See Figure SYSCLK
System clock functionality OK at RAPGSM input? J2851 & J2852 => 38.4MHz differential clock
YES
NO
VCTCXO functionality OK? Measure from AHNE side of R6014
YES
NO
Check Retu's VR1 voltage (C2214) 2.5V and system oscillator parts (G7501, R7508, C7513, R7509, C7507)
Goto Combo memory troubleshooting

Interface troubleshooting

Camera failure

Introduction to camera troubleshooting

Bad conditions often cause bad pictures. Therefore, the camera operation has to be checked in constant conditions or by using a second, known-to-be-good Nokia device as reference. Image quality is hard to measure quantitatively, and the difference between a good and a bad picture can be small. Some training or experience may be needed to detect what is actually wrong.

When checking for possible errors in camera functionality, knowing what error is suspected significantly helps the testing by narrowing down the amount of test cases. The following types of image quality problems are common:

- Dust (black spots)
- Lack of sharpness
- Bit errors

Taking and evaluating test pictures

When *taking* a test picture, remember the following:

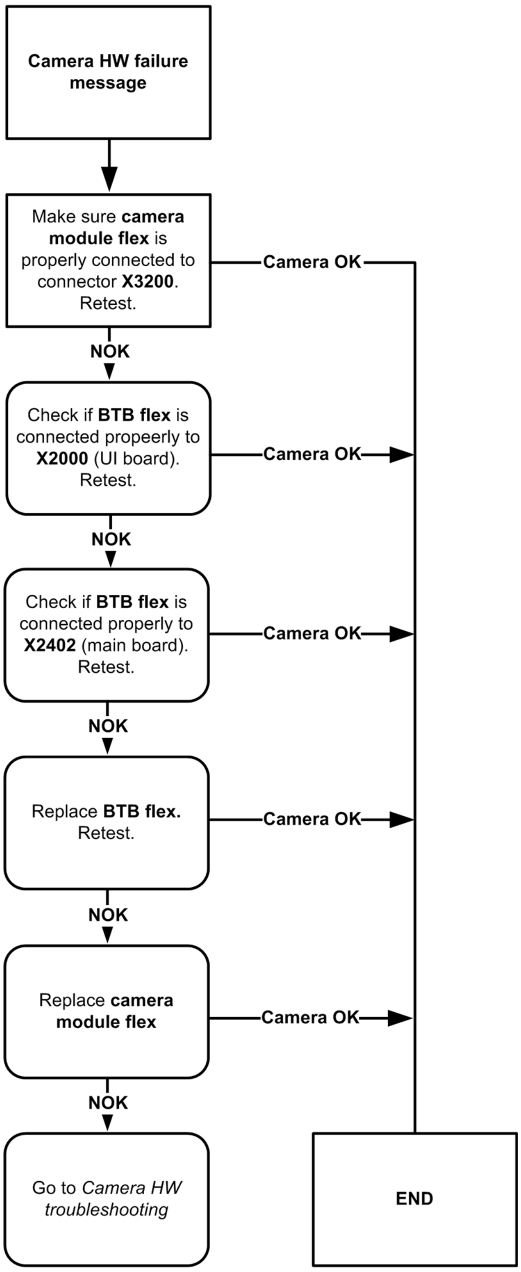
- Avoid bright fluorescent light, 50/60Hz electrical network or high artificial illumination levels
- If the phone is hot, let it rest for a while before taking the picture
- Make sure the optical system is clean
- Use highest possible resolution
- Make sure the light is suffiecient (bright office lightning)
- Do not take the picture towards light source
- Be as still as possible when taking the picture
- Distance should be at least 40cm, 1-2m is recommended

When *evaluating* a test picture, remember the following:

- The center of the picture is sharper than the edges
- The image may be blurred, though it does not show in the viewfinder
- Analyse the picture from your PC monitor, full colour setting is recommended
- If possible, compare with a picture of the same motive taken with a similar Nokia device

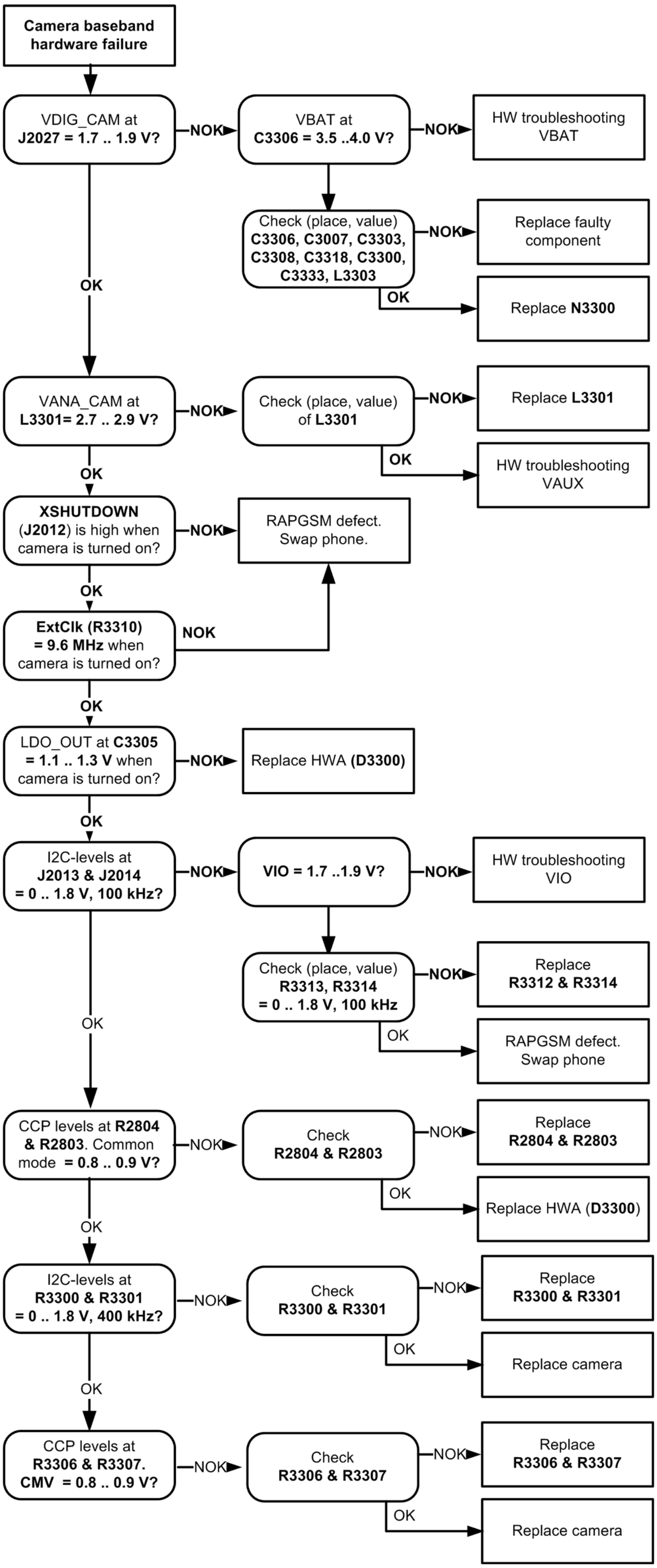
Camera hardware failure message troubleshooting

Troubleshooting flow


Camera HW failure message
Make sure camera module flex is properly connected to connector X3200. Retest.
Camera OK
NOK
Check if BTB flex is connected propeerly to X2000 (UI board). Retest.
Camera OK
NOK
Check if BTB flex is connected properly to X2402 (main board). Retest.
Camera OK
NOK
Replace BTB flex. Retest.
Camera OK
NOK
Replace camera module flex
Camera OK
NOK
Go to Camera HW troubleshooting
END

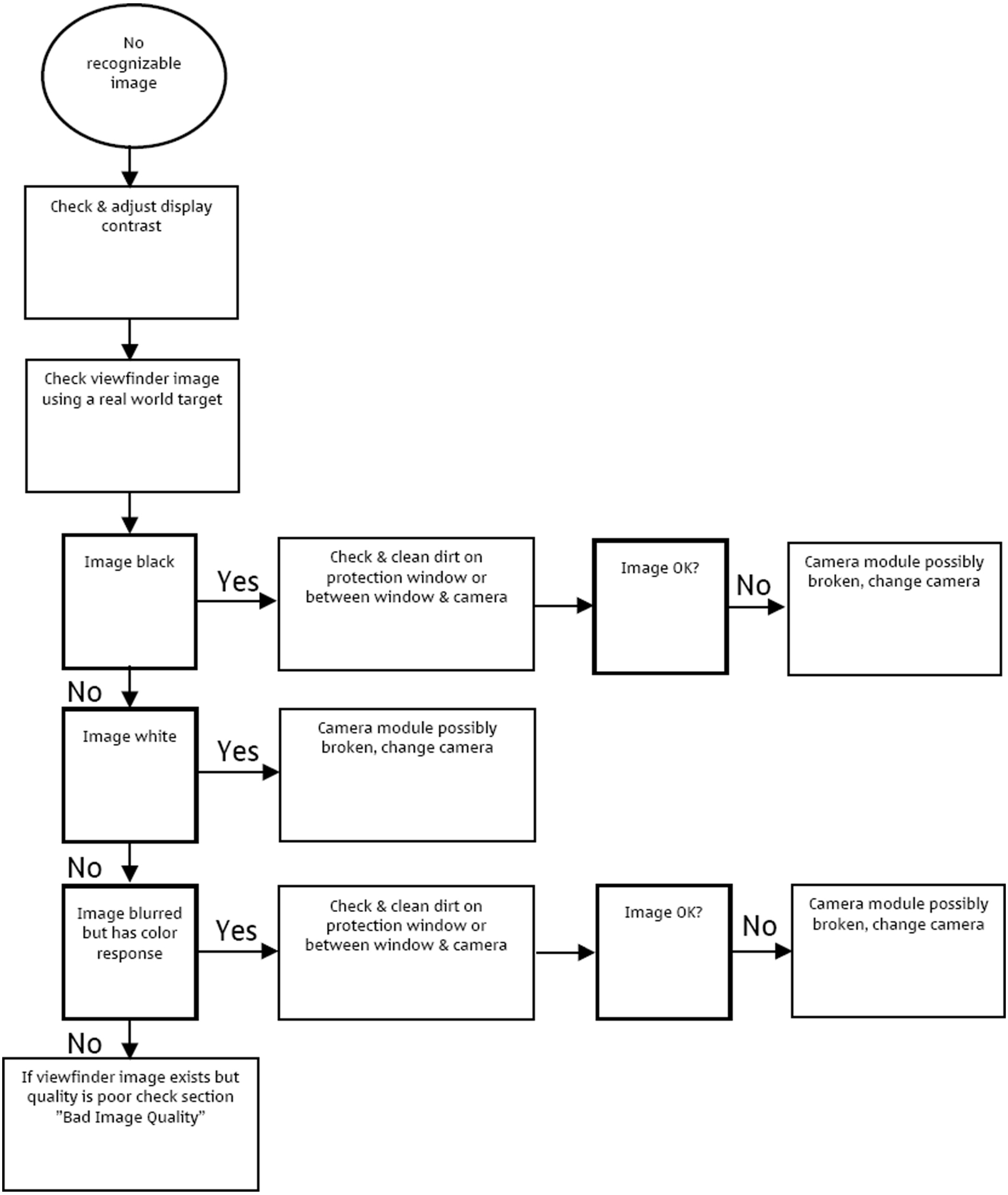
Camera hardware troubleshooting

Camera hardware troubleshooting


Camera baseband hardware failure
VDIG_CAM at J2027 = 1.7 .. 1.9 V?
NOK
VBAT at C3306 = 3.5 ..4.0 V?
NOK
HW troubleshooting VBAT
Check (place, value) C3306, C3007, C3303, C3308, C3318, C3300, C3333, L3303
NOK
Replace faulty component
OK
Replace N3300
OK
VANA_CAM at L3301= 2.7 .. 2.9 V?
NOK
Check (place, value) of L3301
NOK
Replace L3301
OK
HW troubleshooting VAUX
OK
XSHUTDOWN (J2012) is high when camera is turned on?
NOK
RAPGSM defect. Swap phone.
OK
ExtClk (R3310) = 9.6 MHz when camera is turned on?
NOK
OK
LDO_OUT at C3305 = 1.1 .. 1.3 V when camera is turned on?
NOK
Replace HWA (D3300)
OK
I2C-levels at J2013 & J2014 = 0 .. 1.8 V, 100 kHz?
NOK
VIO = 1.7 ..1.9 V?
NOK
HW troubleshooting VIO
Check (place, value) R3313, R3314 = 0 .. 1.8 V, 100 kHz
NOK
Replace R3312 & R3314
OK
RAPGSM defect. Swap phone
OK
CCP levels at R2804 & R2803. Common mode = 0.8 .. 0.9 V?
NOK
Check R2804 & R2803
NOK
Replace R2804 & R2803
OK
Replace HWA (D3300)
OK
I2C-levels at R3300 & R3301 = 0 .. 1.8 V, 400 kHz?
NOK
Check R3300 & R3301
NOK
Replace R3300 & R3301
OK
Replace camera
OK
CCP levels at R3306 & R3307. CMV = 0.8 .. 0.9 V?
NOK
Check R3306 & R3307
NOK
Replace R3306 & R3307
OK
Replace camera

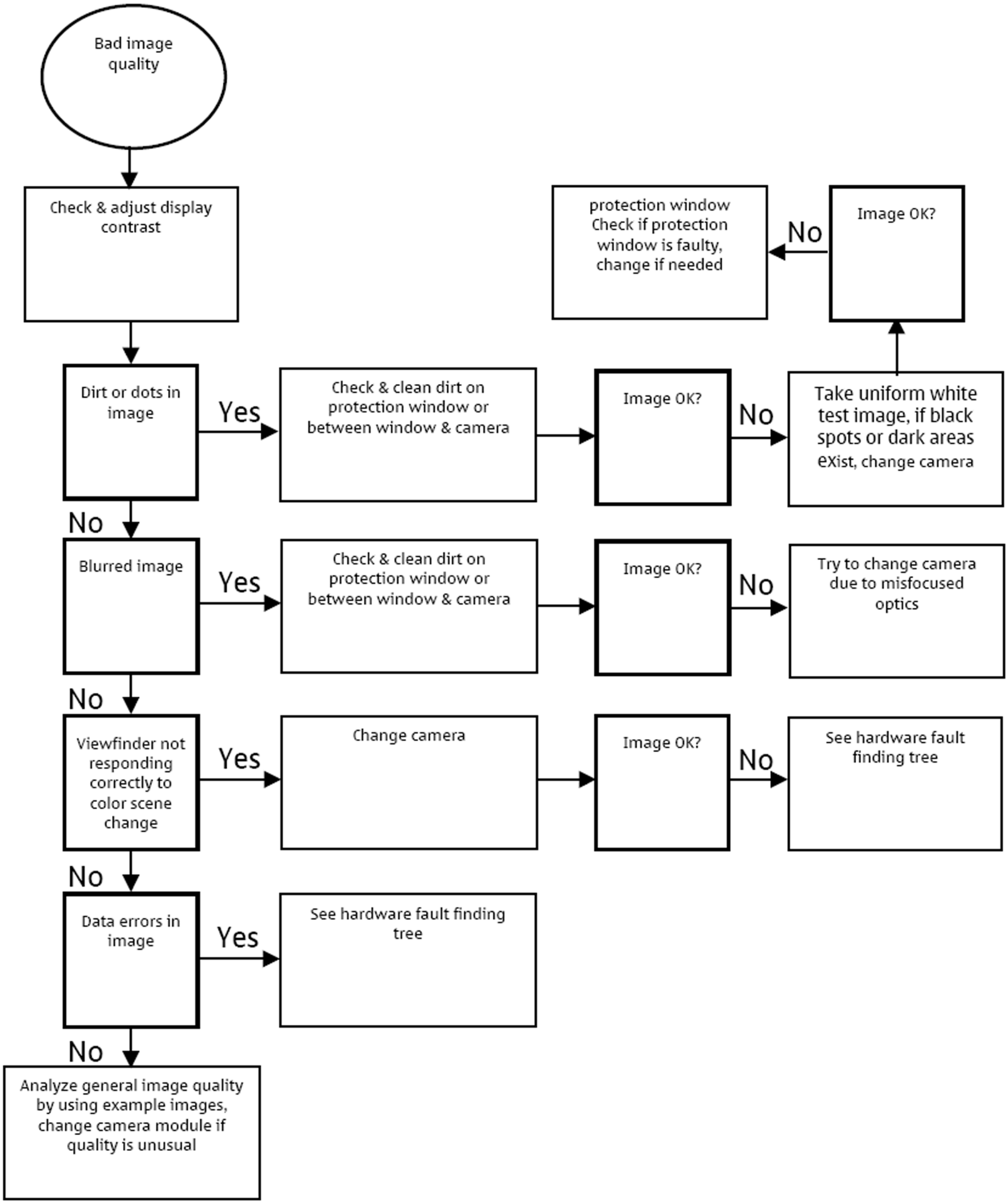
Camera viewfinder troubleshooting

Troubleshooting flow


No recognizable image
Check & adjust display contrast
Check viewfinder image using a real world target
Image black
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Camera module possibly broken, change camera
No
Image white
Yes
Camera module possibly broken, change camera
No
Image blurred but has color response
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Camera module possibly broken, change camera
No
If viewfinder image exists but quality is poor check section "Bad Image Quality"

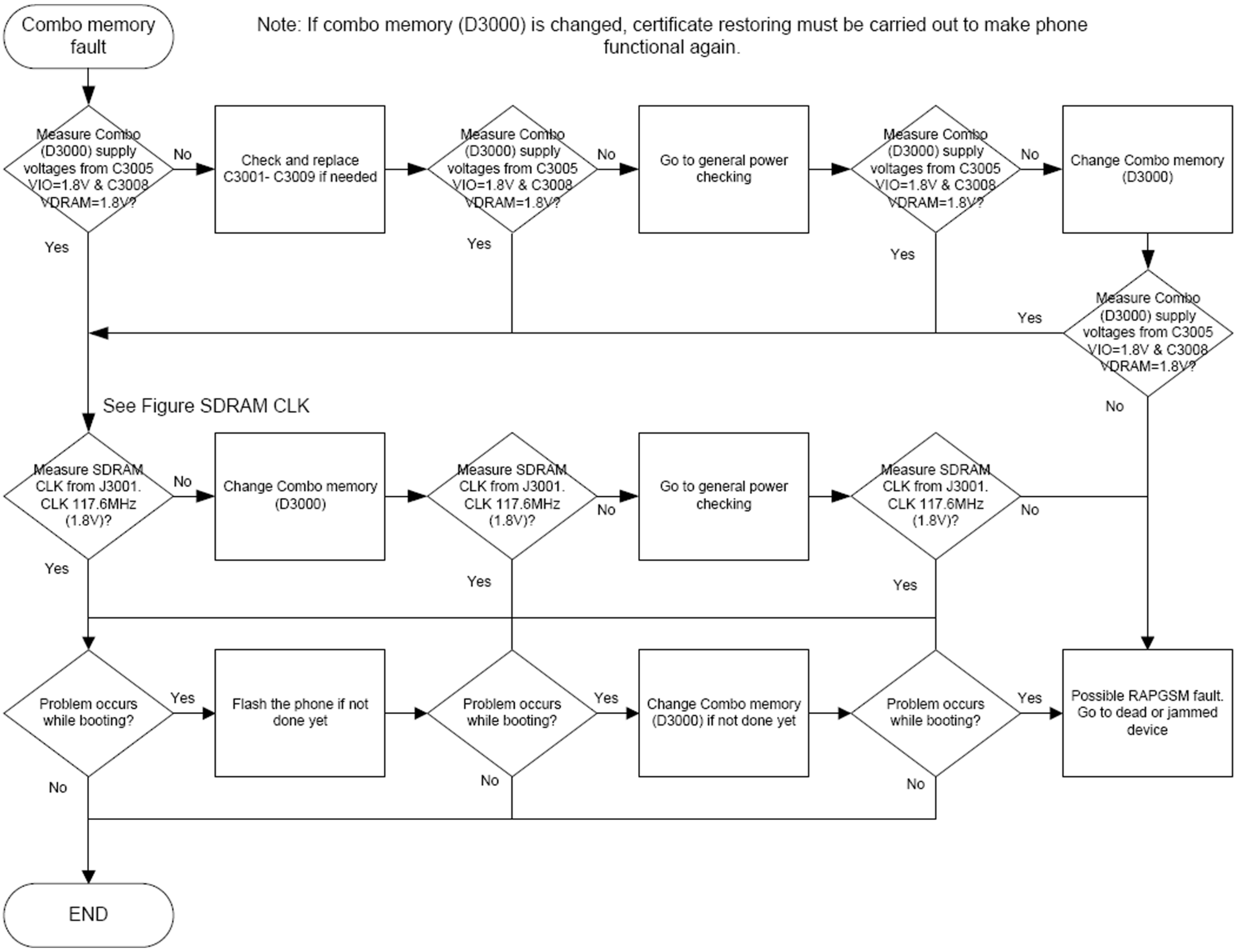
Camera: Bad image quality troubleshooting

Troubleshooting flow


Bad image quality
Check & adjust display contrast
Dirt or dots in image
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Take uniform white test image, if black spots or dark areas exist, change camera
Image OK?
No
protection window Check if protection window is faulty, change if needed
No
Blurred image
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Try to change camera due to misfocused optics
No
Viewfinder not responding correctly to color scene change
Yes
Change camera
Image OK?
No
See hardware fault finding tree
No
Data errors in image
Yes
See hardware fault finding tree
No
Analyze general image quality by using example images, change camera module if quality is unusual

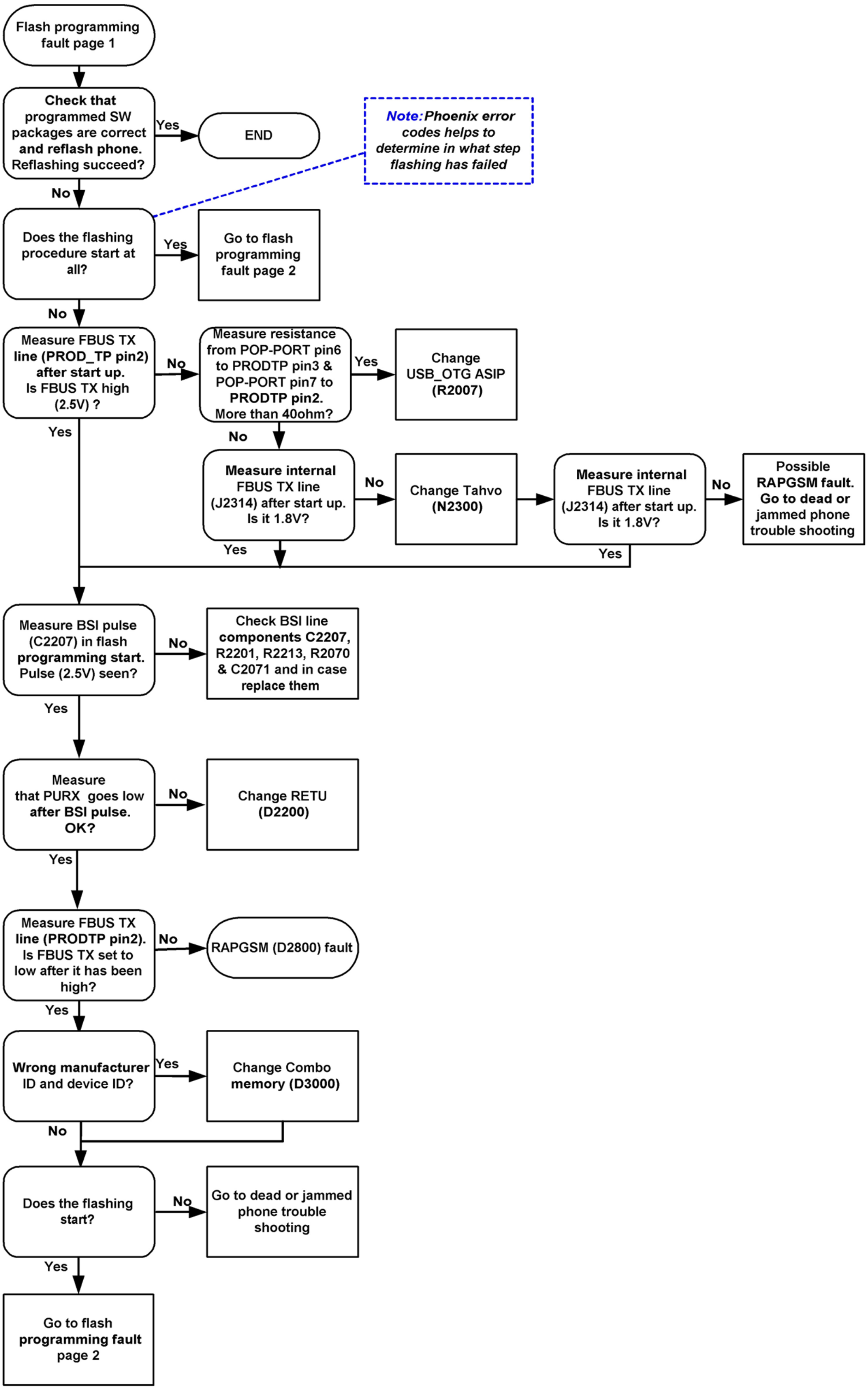
COMBO memory troubleshooting

Troubleshooting flow


Combo memory fault
Note: If combo memory (D3000) is changed, certificate restoring must be carried out to make phone functional again.
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Check and replace C3001- C3009 if needed
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Go to general power checking
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Change Combo memory (D3000)
Yes
Yes
Yes
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
Yes
No
See Figure SDRAM CLK
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Change Combo memory (D3000)
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Go to general power checking
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Yes
Yes
Yes
Problem occurs while booting?
Yes
Flash the phone if not done yet
Problem occurs while booting?
Yes
Change Combo memory (D3000) if not done yet
Problem occurs while booting?
Yes
Possible RAPGSM fault. Go to dead or jammed device
No
No
No
END

Flash programming fault troubleshooting

Part 1


Flash programming fault page 1
Check that programmed SW packages are correct and reflash phone. Reflashing succeed?
Yes
END
Note: Phoenix error codes helps to determine in what step flashing has failed
No
Does the flashing procedure start at all?
Yes
Go to flash programming fault page 2
No
Measure FBUS TX line (PROD_TP pin2) after start up. Is FBUS TX high (2.5V) ?
No
Measure resistance from POP-PORT pin6 to PRODTP pin3 & POP-PORT pin7 to PRODTP pin2. More than 40ohm?
Yes
Change USB_OTG ASIP (R2007)
No
Measure internal FBUS TX line (J2314) after start up. Is it 1.8V?
No
Change Tahvo (N2300)
Measure internal FBUS TX line (J2314) after start up. Is it 1.8V?
No
Possible RAPGSM fault. Go to dead or jammed phone trouble shooting
Yes
Yes
Yes
Measure BSI pulse (C2207) in flash programming start. Pulse (2.5V) seen?
No
Check BSI line components C2207, R2201, R2213, R2070 & C2071 and in case replace them
Yes
Measure that PURX goes low after BSI pulse. OK?
No
Change RETU (D2200)
Yes
Measure FBUS TX line (PRODTP pin2). Is FBUS TX set to low after it has been high?
No
RAPGSM (D2800) fault
Yes
Wrong manufacturer ID and device ID?
Yes
Change Combo memory (D3000)
No
Does the flashing start?
No
Go to dead or jammed phone trouble shooting
Yes
Go to flash programming fault page 2

Part 2

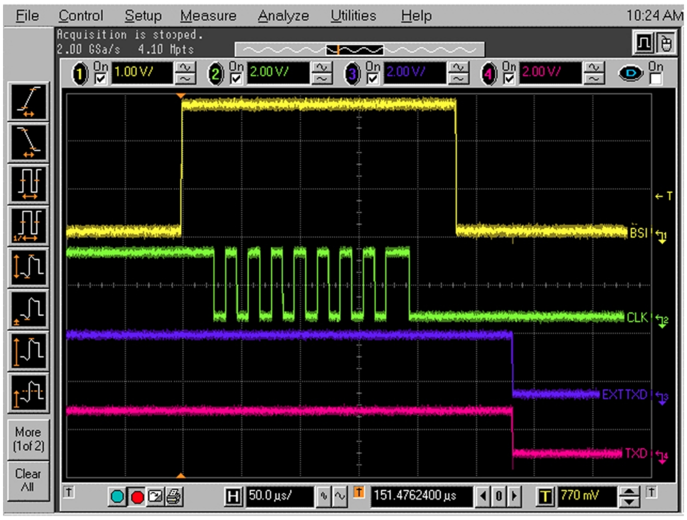

Acquisition is stopped.
2.00 GSa/s 4.10 Mpts
File
Control
Setup
Measure
Analyze
Utilities
Help
10:24 AM
1.00 V/
2.00 V/
2.00 V/
2.00 V/
BSI
CLK
EXTTXD
TXD
More (1of 2)
Clear All
50.0 µs/
151.4762400 µs
770 mV

Figure 36 Flashing pic 1. Take single trig measurement for the rise of the BSI signal.

Saved: 05 JUL 2004 13:24:19

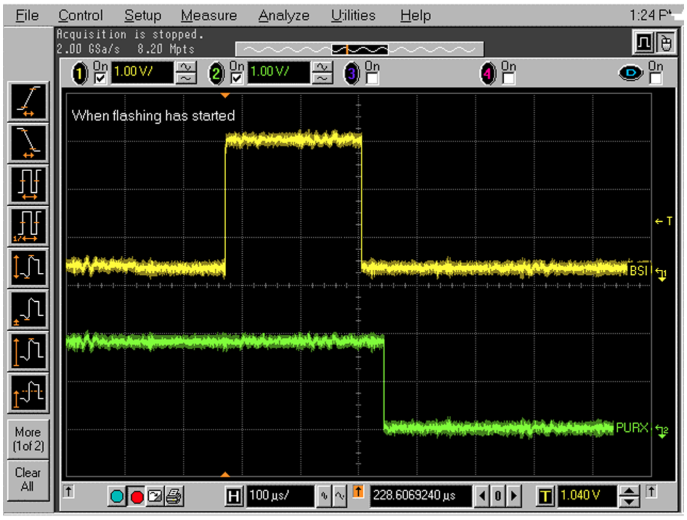
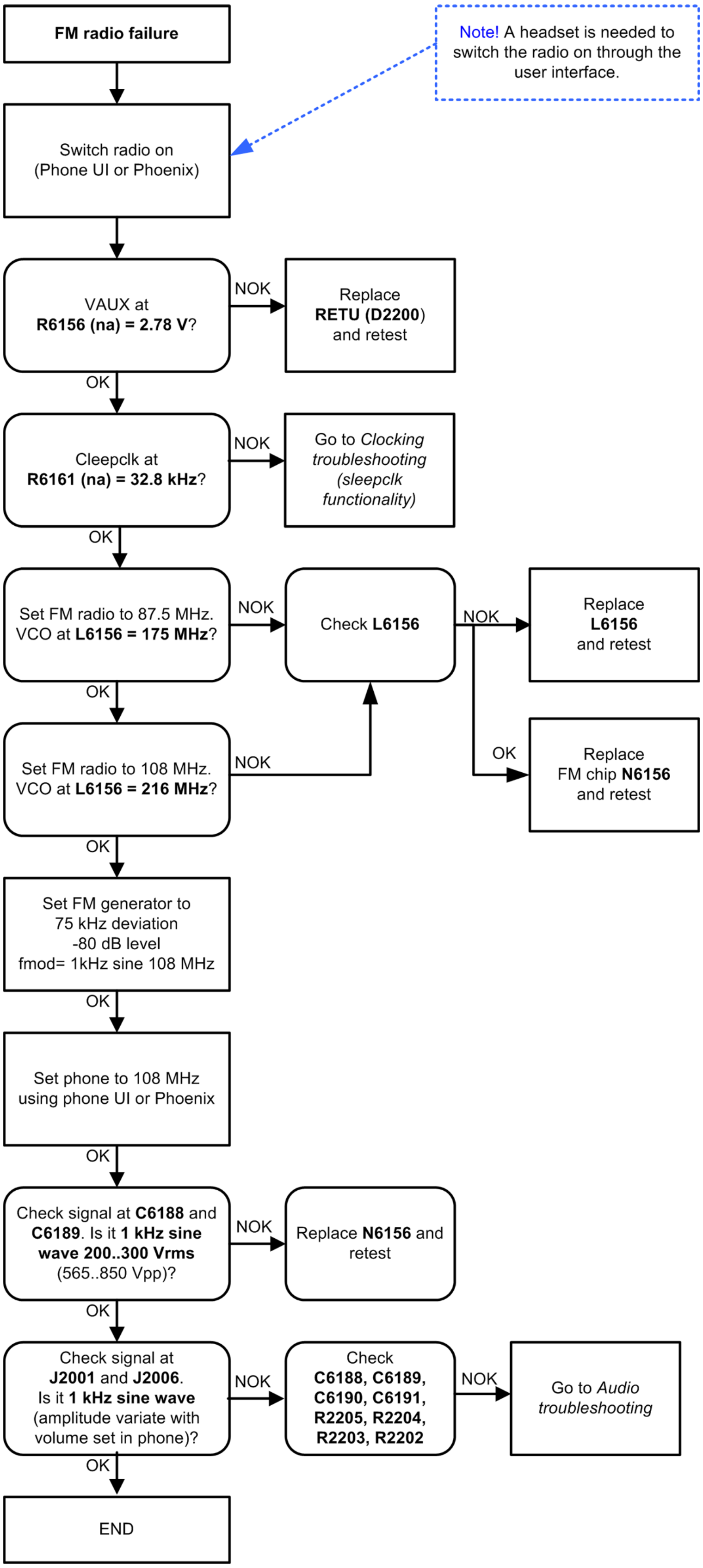

Acquisition is stopped.
2.00 GSa/s 8.20 Mpts
File
Control
Setup
Measure
Analyze
Utilities
Help
1:24 P
1.00 V/
1.00 V/
When flashing has started
BSI
PURX
More (1of 2)
Clear All
100 µs/
228.6069240 µs
1.040 V

Figure 37 Flashing pic 2. Take single trig measurement for the rise of the BSI signal.

FM radio troubleshooting

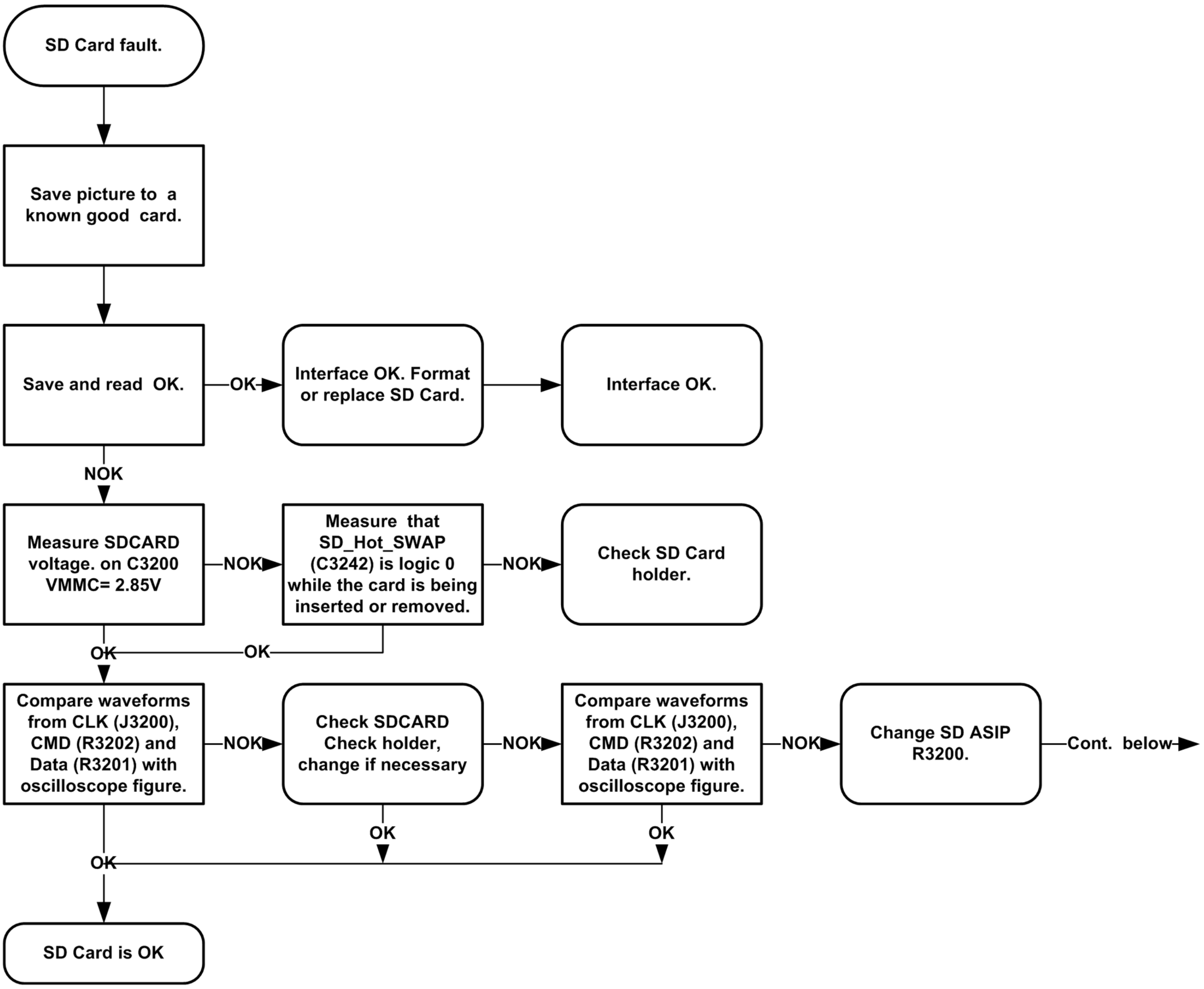
Troubleshooting flow

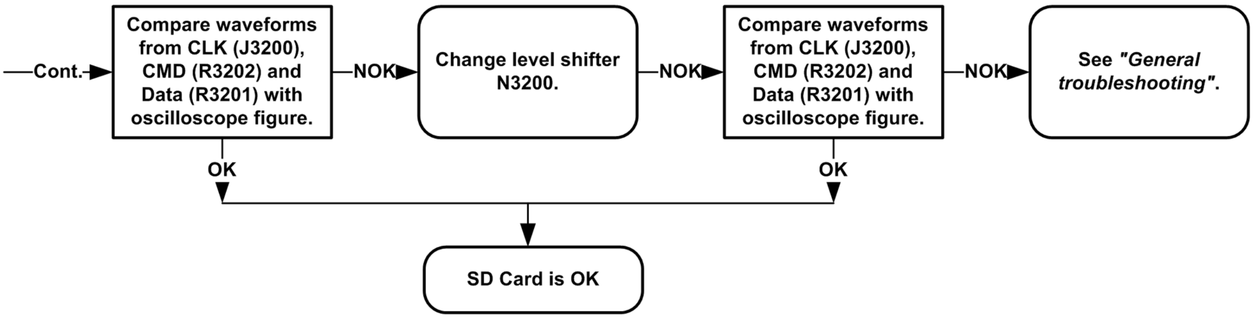
Note: FM radio is not supported by all variants!

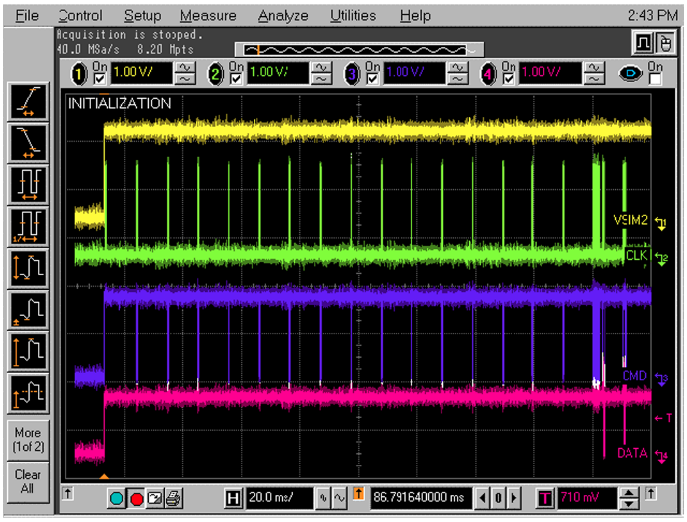

FM radio failure
Note! A headset is needed to switch the radio on through the user interface.
Switch radio on (Phone UI or Phoenix)
VAUX at R6156 (na) = 2.78 V?
NOK
Replace RETU (D2200) and retest
OK
Cleepclk at R6161 (na) = 32.8 kHz?
NOK
Go to Clocking troubleshooting (sleepclk functionality)
OK
Set FM radio to 87.5 MHz. VCO at L6156 = 175 MHz?
NOK
Check L6156
NOK
Replace L6156 and retest
OK
Replace FM chip N6156 and retest
OK
Set FM radio to 108 MHz. VCO at L6156 = 216 MHz?
NOK
OK
Set FM generator to 75 kHz deviation -80 dB level fmod= 1kHz sine 108 MHz
OK
Set phone to 108 MHz using phone UI or Phoenix
OK
Check signal at C6188 and C6189. Is it 1 kHz sine wave 200..300 Vrms (565..850 Vpp)?
NOK
Replace N6156 and retest
OK
Check signal at J2001 and J2006. Is it 1 kHz sine wave (amplitude variate with volume set in phone)?
NOK
Check C6188, C6189, C6190, C6191, R2205, R2204, R2203, R2202
NOK
Go to Audio troubleshooting
OK
END

SD card troubleshooting

Troubleshooting flow


SD Card fault.
Save picture to a known good card.
Save and read OK.
OK
Interface OK. Format or replace SD Card.
Interface OK.
NOK
Measure SDCARD voltage. on C3200 VMMC= 2.85V
NOK
Measure that SD_Hot_SWAP (C3242) is logic 0 while the card is being inserted or removed.
NOK
Check SD Card holder.
OK
OK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Check SDCARD Check holder, change if necessary
NOK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Change SD ASIP R3200.
Cont. below
OK
OK
OK
SD Card is OK


Cont.
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Change level shifter N3200.
NOK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
See "General troubleshooting".
OK
OK
SD Card is OK


File
Control
Setup
Measure
Analyze
Utilities
Help
2:43 PM
Acquisition is stopped.
40.0 MSa/s 8.20 Mpts
1.00 V/
1.00 V/
1.00 V/
1.00 V/
INITIALIZATION
VSIM2
CLK
CMD
DATA
More (1of 2)
Clear All
20.0 ms/
86.791640000 ms
710 mV

Take single trig measurement on the rising edge of the DAT signal.

Figure 38 SD card initialization from pin J3206

User interface troubleshooting

Display module troubleshooting

General instructions for display troubleshooting

Context

- The display is in a normal mode when the phone is in active use.
- Display is in a partial idle mode when the phone is in the screen saver mode.
- The operating modes of the display can be controlled with the help of *Phoenix*.

Table 10 Display module troubleshooting cases

Display blank	There is no image on the display. The display looks the same when the phone is on as it does when the phone is off. The backlight can be on in some cases.
Image on the display not correct	Image on the display can be corrupted or a part of the image can be missing. If a part of the image is missing, change the display module. If the image is otherwise corrupted, follow the appropriate troubleshooting diagram.
Backlight dim or not working at all	Backlight LED components are inside the display module. Backlight failure can also be in the connector or in the backlight power source in the main engine of the phone. This means that in case the display is working (image OK), the backlight is faulty.

Visual defects (pixel)	Pixel defects can be checked by controlling the display with Phoenix. Use both colours, black and white, on a full screen. The display may have some random pixel defects that are acceptable for this type of display. The criteria when pixel defects are regarded as a display failure, resulting in a replacement of the display, are presented the following table.

Table 11 Pixel defects

Item		White dot defect				Black dot defect	Total
1	Defect counts	R	G	B	White Dot Total	1	1
		1	1	1	1		
2	Combined defect counts	Not allowed. Two single dot defects that are within 5 mm of each other should be interpreted as combined dot defect.					

Steps

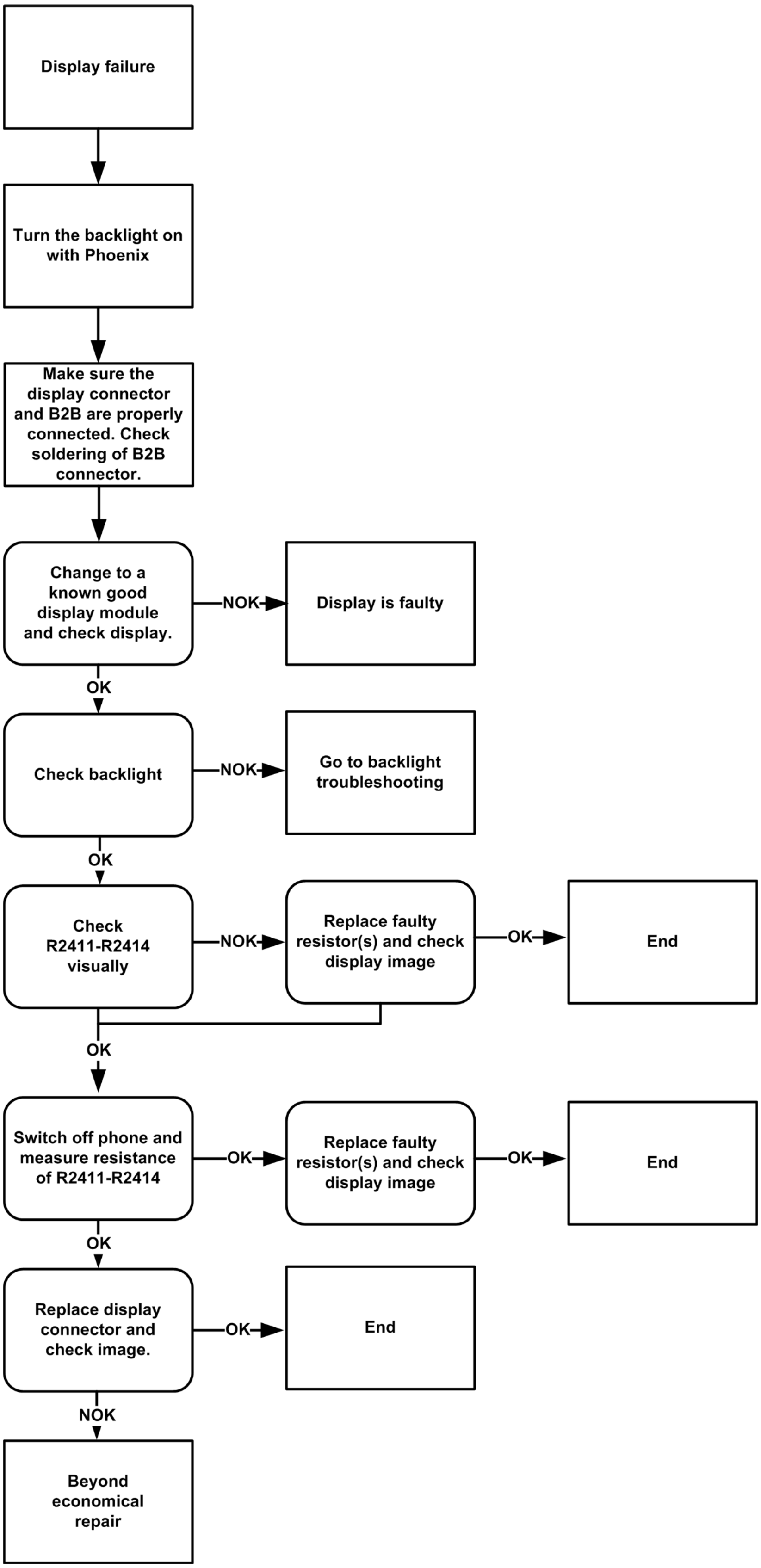
1. Verify with a working display that the fault is not on the display module itself.

   The display module cannot be repaired.
2. Check that the cellular engine is working normally.
   - i To check the functionality, connect the phone to a docking station.
   - ii Start *Phoenix* service software.
   - iii Read the phone information to check that also the application engine is functioning normally (you should be able to read the APE ID).
3. Proceed to the display troubleshooting flowcharts.

   Use the **Display Test** tool in *Phoenix* to find the detailed fault mode.

Display troubleshooting

Troubleshooting flow

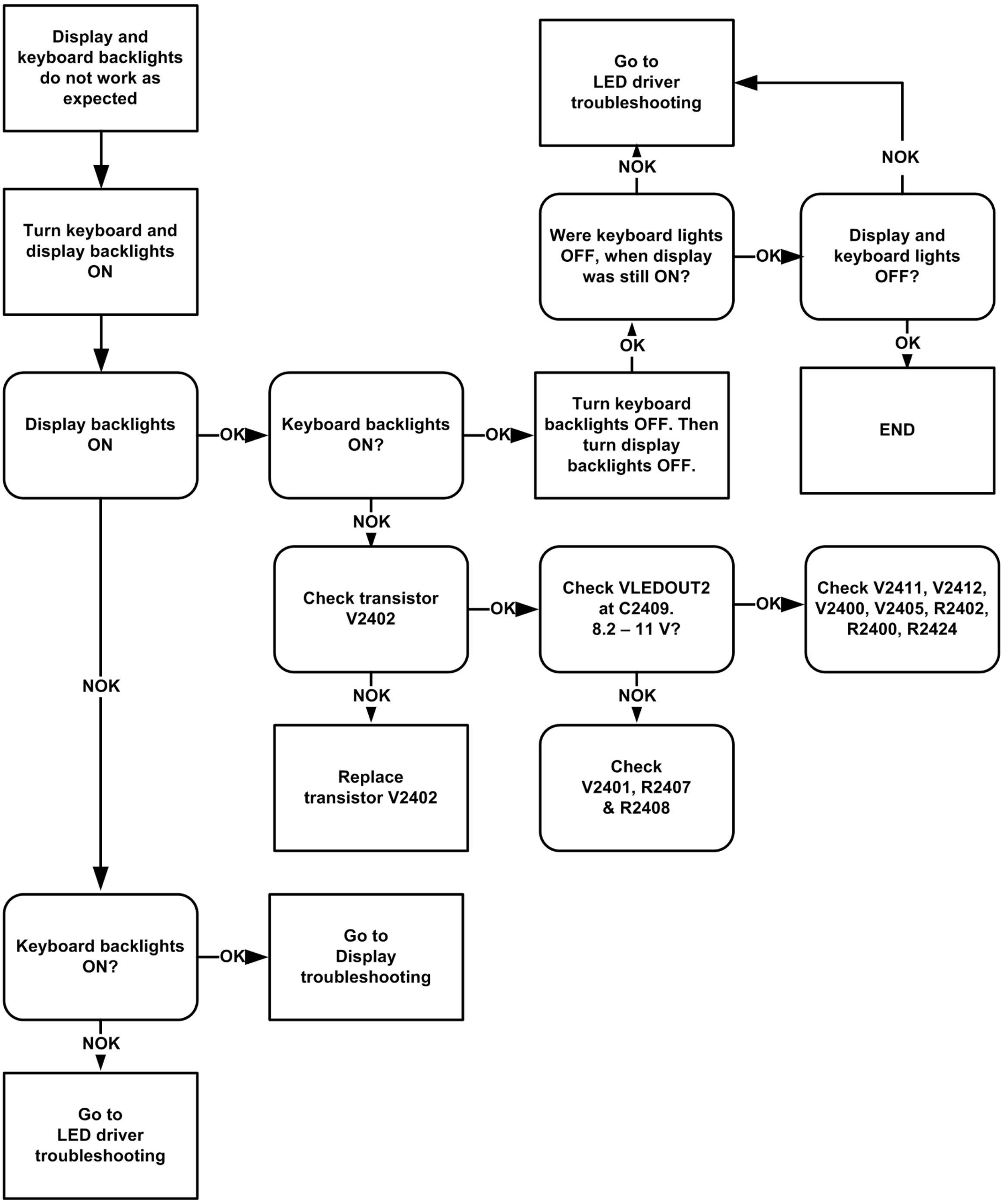

Display failure
Turn the backlight on with Phoenix
Make sure the display connector and B2B are properly connected. Check soldering of B2B connector.
Change to a known good display module and check display.
NOK
Display is faulty
OK
Check backlight
NOK
Go to backlight troubleshooting
OK
Check R2411-R2414 visually
NOK
Replace faulty resistor(s) and check display image
OK
End
OK
Switch off phone and measure resistance of R2411-R2414
OK
Replace faulty resistor(s) and check display image
OK
End
OK
Replace display connector and check image.
OK
End
NOK
Beyond economical repair

Backlight troubleshooting

Context

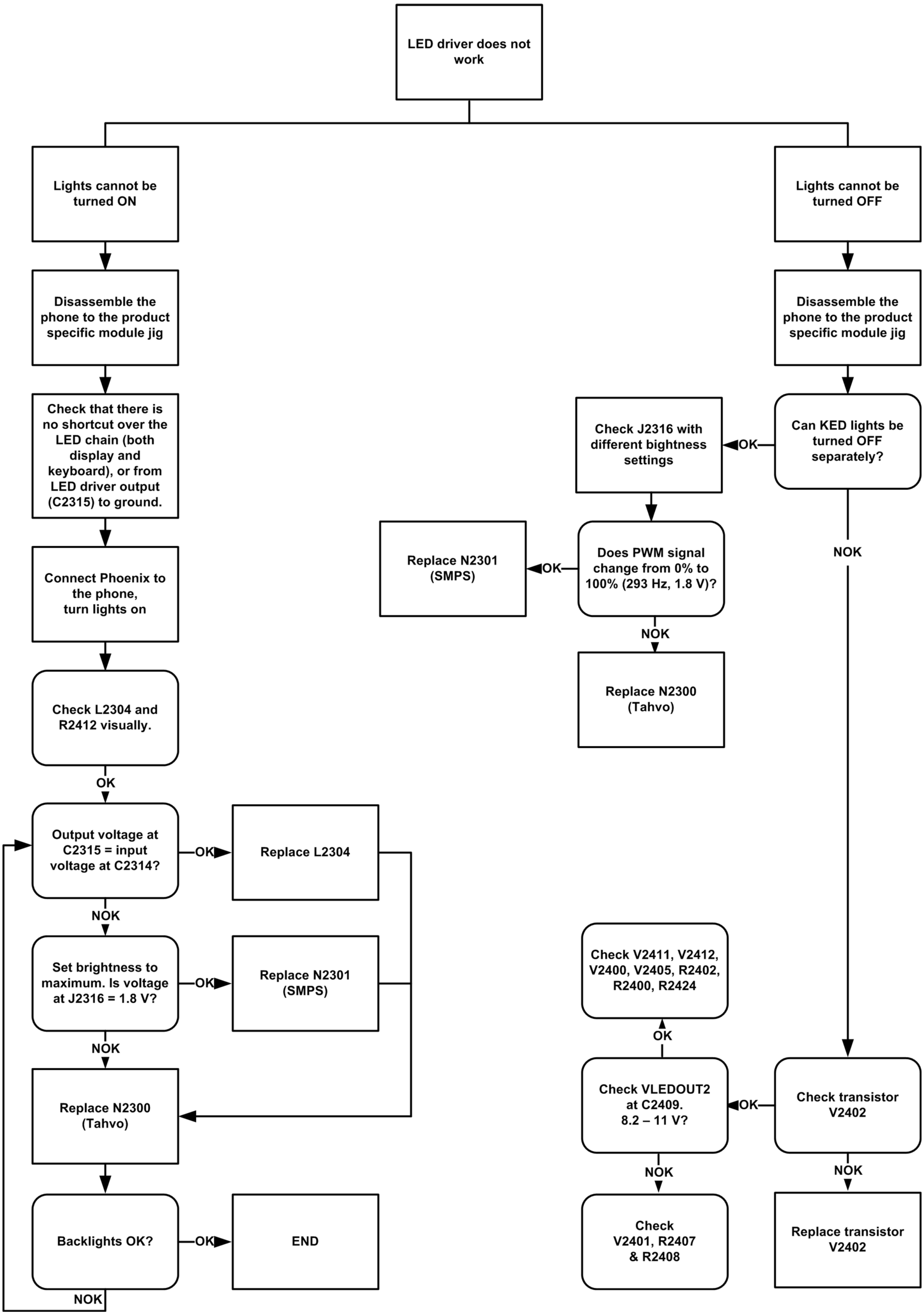
The device has one LED driver that provides current for both display and keyboard backlights. Brightness can be adjusted manually. It affects both display and keypad. Keyboard backlights can be turned ON/OFF separately but not without switching on the display lights.

Display and keyboard backlight troubleshooting


Display and keyboard backlights do not work as expected
Turn keyboard and display backlights ON
Display backlights ON
OK
Keyboard backlights ON?
OK
Turn keyboard backlights OFF. Then turn display backlights OFF.
OK
Were keyboard lights OFF, when display was still ON?
NOK
Go to LED driver troubleshooting
OK
Display and keyboard lights OFF?
NOK
OK
END
NOK
Check transistor V2402
OK
Check VLEDOUT2 at C2409. 8.2 – 11 V?
OK
Check V2411, V2412, V2400, V2405, R2402, R2400, R2424
NOK
Replace transistor V2402
NOK
Check V2401, R2407 & R2408
NOK
Keyboard backlights ON?
OK
Go to Display troubleshooting
NOK
Go to LED driver troubleshooting

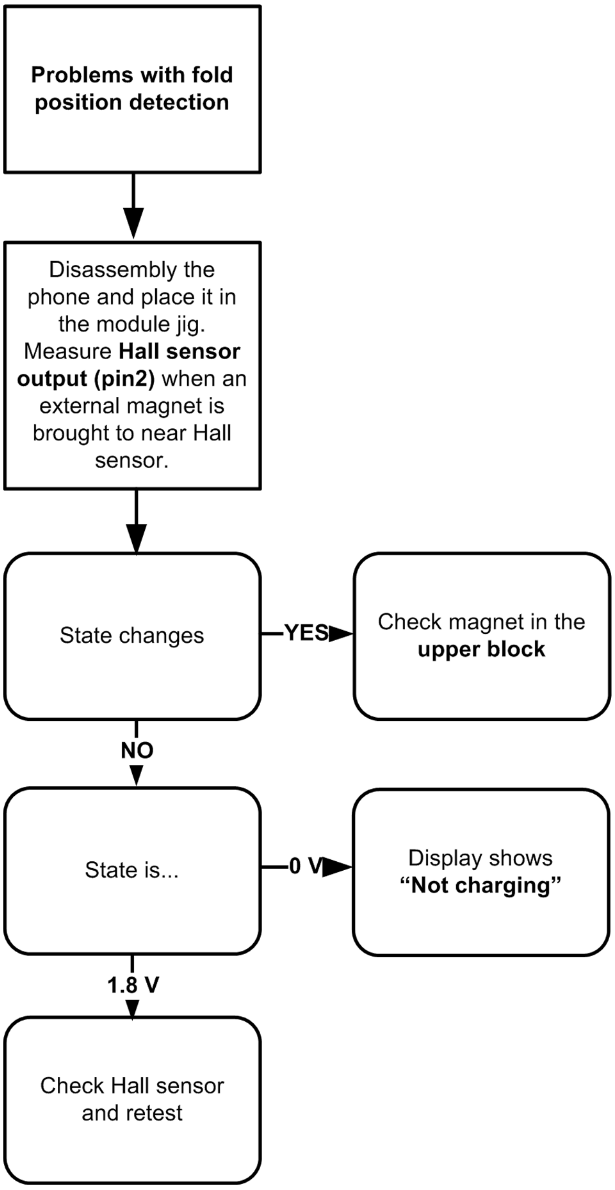
LED driver troubleshooting

LED driver troubleshooting


LED driver does not work
Lights cannot be turned ON
Lights cannot be turned OFF
Disassemble the phone to the product specific module jig
Disassemble the phone to the product specific module jig
Check that there is no shortcut over the LED chain (both display and keyboard), or from LED driver output (C2315) to ground.
Check J2316 with different bightness settings
OK
Can KED lights be turned OFF separately?
Connect Phoenix to the phone, turn lights on
Replace N2301 (SMPS)
OK
Does PWM signal change from 0% to 100% (293 Hz, 1.8 V)?
NOK
NOK
Replace N2300 (Tahvo)
Check L2304 and R2412 visually.
OK
Output voltage at C2315 = input voltage at C2314?
OK
Replace L2304
NOK
Set brightness to maximum. Is voltage at J2316 = 1.8 V?
OK
Replace N2301 (SMPS)
Check V2411, V2412, V2400, V2405, R2402, R2400, R2424
OK
NOK
Replace N2300 (Tahvo)
Check VLEDOUT2 at C2409. 8.2 – 11 V?
OK
Check transistor V2402
NOK
NOK
Backlights OK?
OK
END
Check V2401, R2407 & R2408
Replace transistor V2402
NOK

Fold switch/Hall sensor troubleshooting

Troubleshooting flow


Problems with fold position detection
Disassembly the phone and place it in the module jig. Measure Hall sensor output (pin2) when an external magnet is brought to near Hall sensor.
State changes
YES
Check magnet in the upper block
NO
State is...
0 V
Display shows "Not charging"
1.8 V
Check Hall sensor and retest

Audio troubleshooting

Introduction to acoustics troubleshooting

> **Note:** Always make sure all openings are clean and all contact pads are intact and make contact. If audio still does not work, please continue to the electronic audio troubleshooting (2nd diagram where applicable).

Acoustics design ensures that the sound is detected correctly with a microphone and properly radiated to the outside of the device by speaker(s). The acoustics of the phone includes three basic systems: earpiece, Integrated Hands Free (IHF) and microphone.

The sound reproduced from the earpiece readiates through a single hole on the front cover (A-cover). The sound reproduced from the IHF speaker radiates from a single sound hole located 3 cm below the power key. The microphone is located at the hinge, next to the system connector.

For a correct functionality of the phone, all sound holes must be always open. When the phone is used, care must be taken not to close any of those holes with a hand or fingers. The phone should be dry and clean, and no objects must be located in such a way that they close any of the holes.

Audio troubleshooting test instructions

Differential external earpiece and internal earpiece outputs can be measured either with a single-ended or a differential probe.

When measuring with a single-ended probe each output is measured against the ground.

Internal handsfree output is measured using a current probe, if a special low-pass filter designed for measuring a digital amplifier is not available. Note also that when using a current probe, the input signal frequency must be set to 2kHz.

The input signal for each loop test can be either single-ended or differential.

Required equipment

The following equipment is needed for the tests:

- Oscilloscope
- Function generator (sine waveform)
- Current probe (Internal handsfree PWM output measurement)
- Phoenix service software
- Battery voltage 3.7V

Test procedure

Audio can be tested using the Phoenix audio routings option. Three different audio loop paths can be activated:

- External microphone to Internal earpiece
- External microphone to Internal handsfree speaker
- Internal microphone to External earpiece

Each audio loop sets routing from the specified input to the specified output enabling a quick in-out test. Loop path gains are fixed and they cannot be changed using Phoenix. Correct pins and signals for each test are presented in the following table.

Phoenix audio loop tests and test results

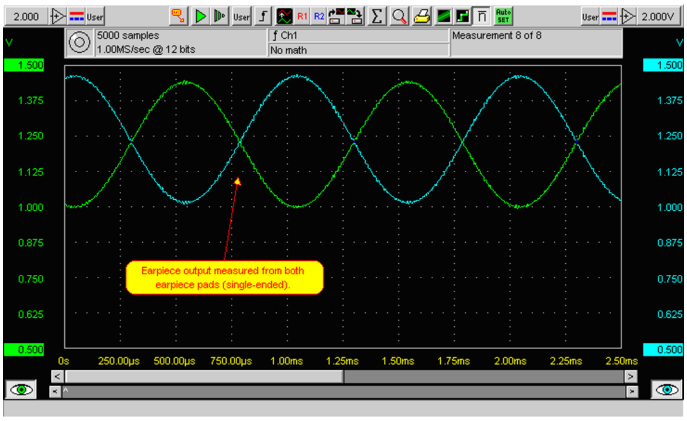
The results presented in the table apply when no accessory is connected and battery voltage is set to 3.7V.

Earpiece, internal microphone and speaker are in place during measurement. Applying a headset accessory during measurement causes a significant drop in measured quantities.

The gain values presented in the table apply for a differential output vs. single-ended/differential input.

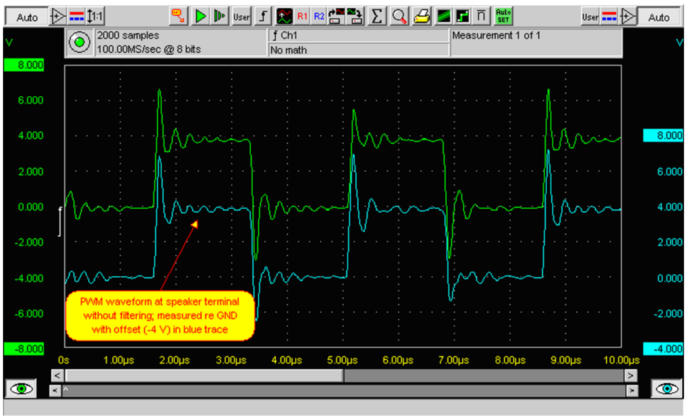
Loop test	Input terminal	Output terminal	Path gain [dB] (fixed)	Input voltage [mVp-p]	Differential output voltage [mVp-p]	Output DC level [V]	Output current [mA]
External Mic to External Earpiece	XMICP and GND	HSEAR R P, HSEAR R N and GND	-2.9	1000	720	1.2	NA
		HSEAR P, HSEAR N and GND					
	XMICN and GND	HSEAR R P, HSEAR R N and GND					
		HSEAR P, HSEAR N and GND					
External Mic to Internal Earpiece	XMICP and GND	EarP and GND	-4.0	750	490	1.2	NA
		EarN and GND					
	XMICN and GND	EarP and GND					
		EarN and GND					
External Mic to Internal handsfree	XMICP and GND	B2102 pads	8.5	920	2520	0	25mA (calc.)
	XMICN and GND	B2102 pads					
Internal Mic to External Earpiece	B2100 (OUT/ GND)	HSEAR R P, HSEAR R N and GND	22.7	100	1360	1.2	NA
		HSEAR P, HSEAR N and GND					
		HSEAR R P, HSEAR R N and GND					
		HSEAR P, HSEAR N and GND					

Measurement data


5000 samples
1.00MS/sec @ 12 bits
Ch1
No math
Measurement 8 of 8

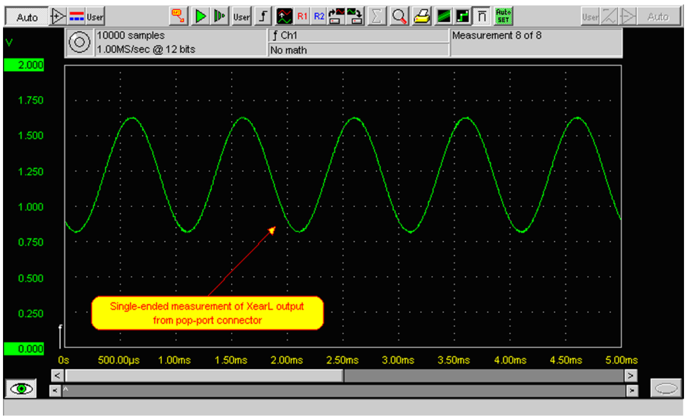
Earpiece output measured from both earpiece pads (single-ended).
2.000
User
User
2.000V
V
1.500
1.375
1.250
1.125
1.000
0.875
0.750
0.625
0.500
0s
250.00µs
500.00µs
750.00µs
1.00ms
1.25ms
1.50ms
1.75ms
2.00ms
2.25ms
2.50ms

Figure 39 Single-ended output waveform of the Ext_in_HP_out measurement when earpiece is connected.


2000 samples
100.00MS/sec @ 8 bits
Ch1
No math
Measurement 1 of 1

PWM waveform at speaker terminal without filtering; measured re GND with offset (-4 V) in blue trace
Auto
1:1
User
Auto
V
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
-6.000
-8.000
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
0s
1.00µs
2.00µs
3.00µs
4.00µs
5.00µs
6.00µs
7.00µs
8.00µs
9.00µs
10.00µs

Figure 40 Differential output waveform of the Ext_in_IHF_out out loop measurement when speaker is connected.

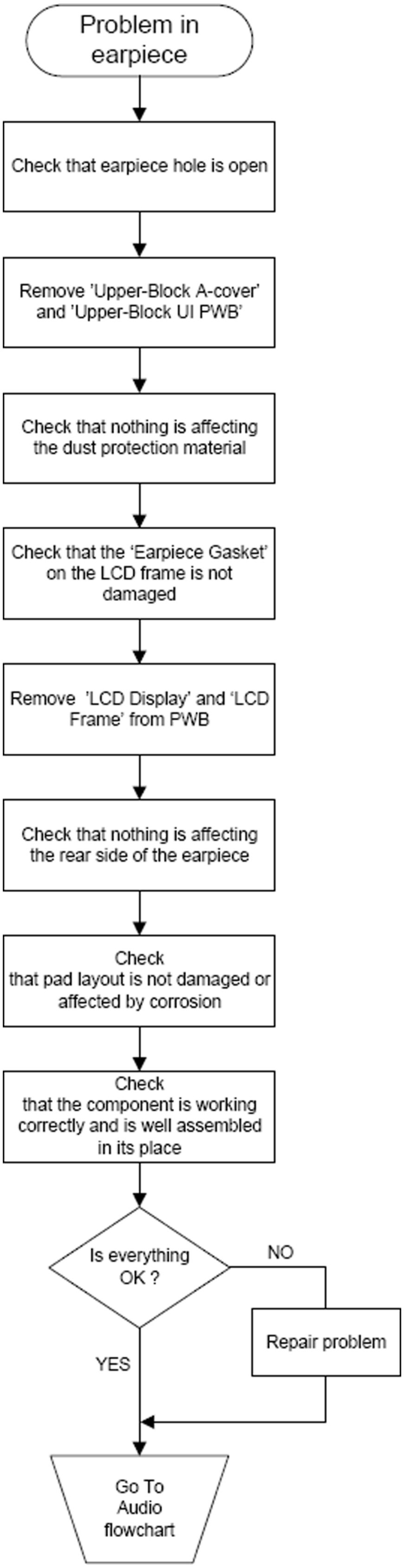

10000 samples
1.00MS/sec @ 12 bits
Ch1
No math
Measurement 8 of 8

Single-ended measurement of XearL output from pop-port connector
Auto
User
Auto
V
2.000
1.750
1.500
1.250
1.000
0.750
0.500
0.250
0.000
0s
500.00µs
1.00ms
1.50ms
2.00ms
2.50ms
3.00ms
3.50ms
4.00ms
4.50ms
5.00ms

Figure 41 Single-ended output waveform of the HP_in_Ext_out loop when microphone is connected.

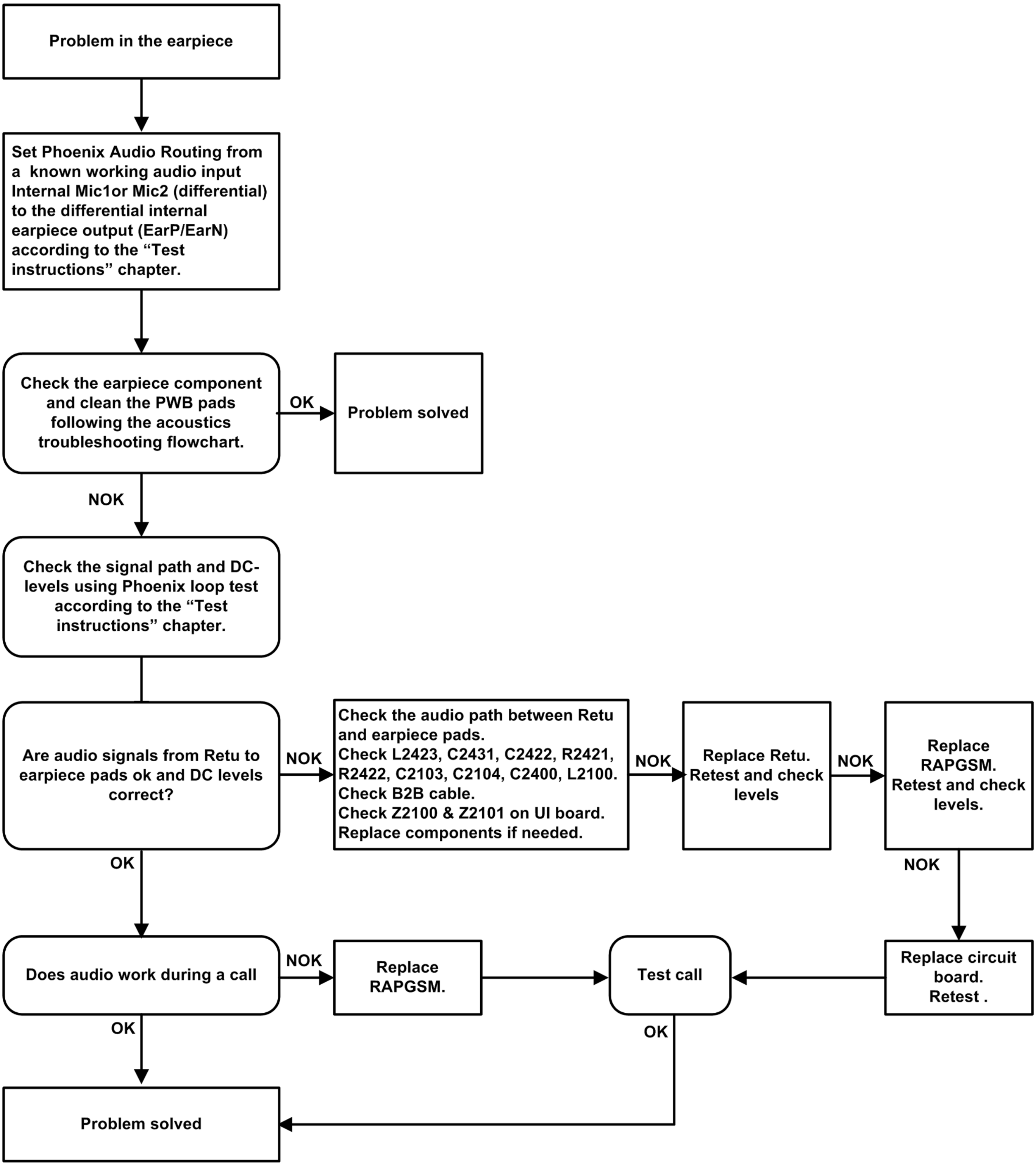
Earpiece troubleshooting

Troubleshooting flow


Problem in earpiece
Check that earpiece hole is open
Remove 'Upper-Block A-cover' and 'Upper-Block UI PWB'
Check that nothing is affecting the dust protection material
Check that the 'Earpiece Gasket' on the LCD frame is not damaged
Remove 'LCD Display' and 'LCD Frame' from PWB
Check that nothing is affecting the rear side of the earpiece
Check that pad layout is not damaged or affected by corrosion
Check that the component is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

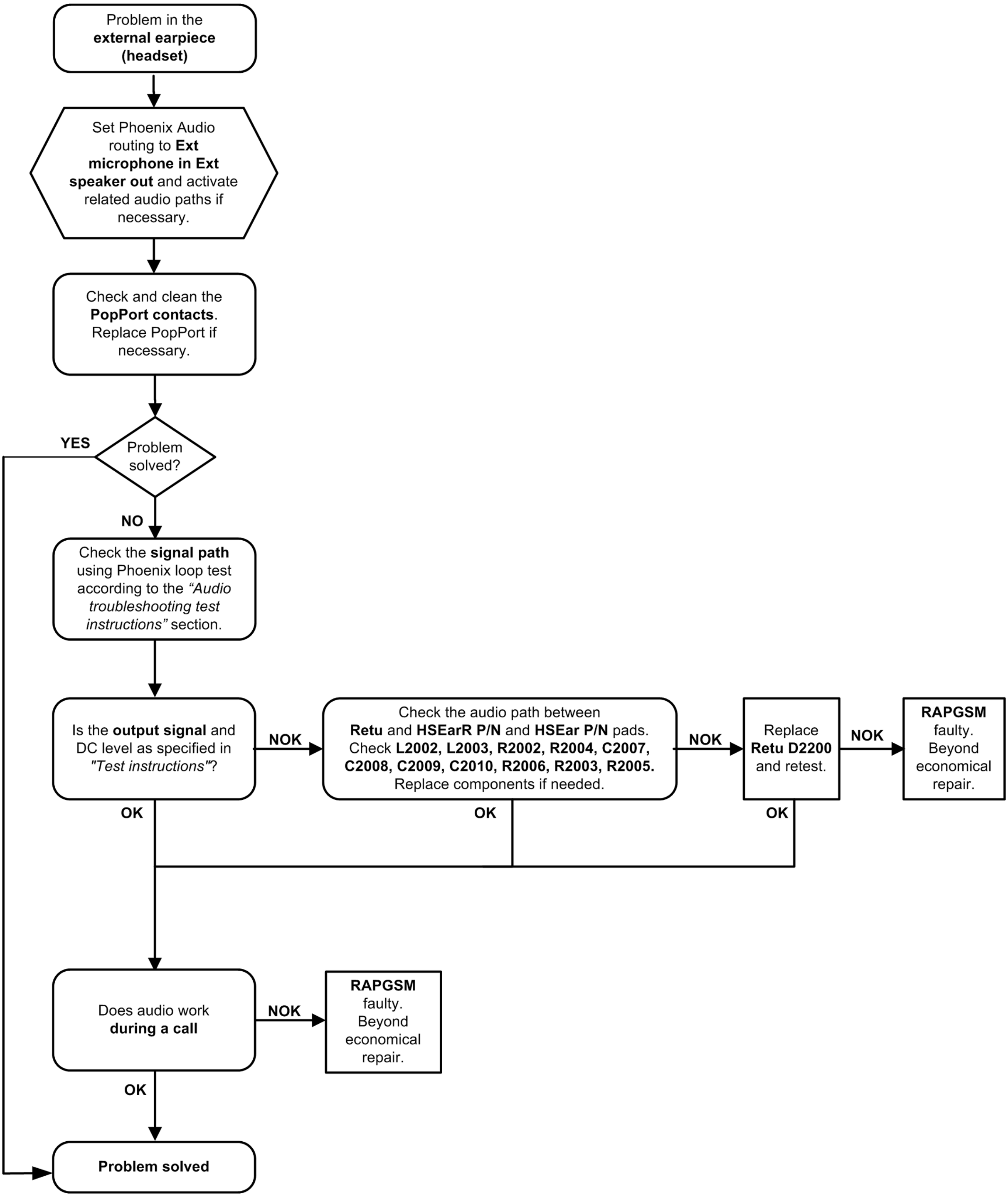
Internal earpiece troubleshooting

Troubleshooting flow


Problem in the earpiece
Set Phoenix Audio Routing from a known working audio input Internal Mic1or Mic2 (differential) to the differential internal earpiece output (EarP/EarN) according to the "Test instructions" chapter.
Check the earpiece component and clean the PWB pads following the acoustics troubleshooting flowchart.
OK
Problem solved
NOK
Check the signal path and DC-levels using Phoenix loop test according to the "Test instructions" chapter.
Are audio signals from Retu to earpiece pads ok and DC levels correct?
NOK
Check the audio path between Retu and earpiece pads.
Check L2423, C2431, C2422, R2421, R2422, C2103, C2104, C2400, L2100.
Check B2B cable.
Check Z2100 & Z2101 on UI board.
Replace components if needed.
NOK
Replace Retu. Retest and check levels
NOK
Replace RAPGSM. Retest and check levels.
NOK
OK
Does audio work during a call
NOK
Replace RAPGSM.
Test call
Replace circuit board. Retest .
OK
OK
Problem solved

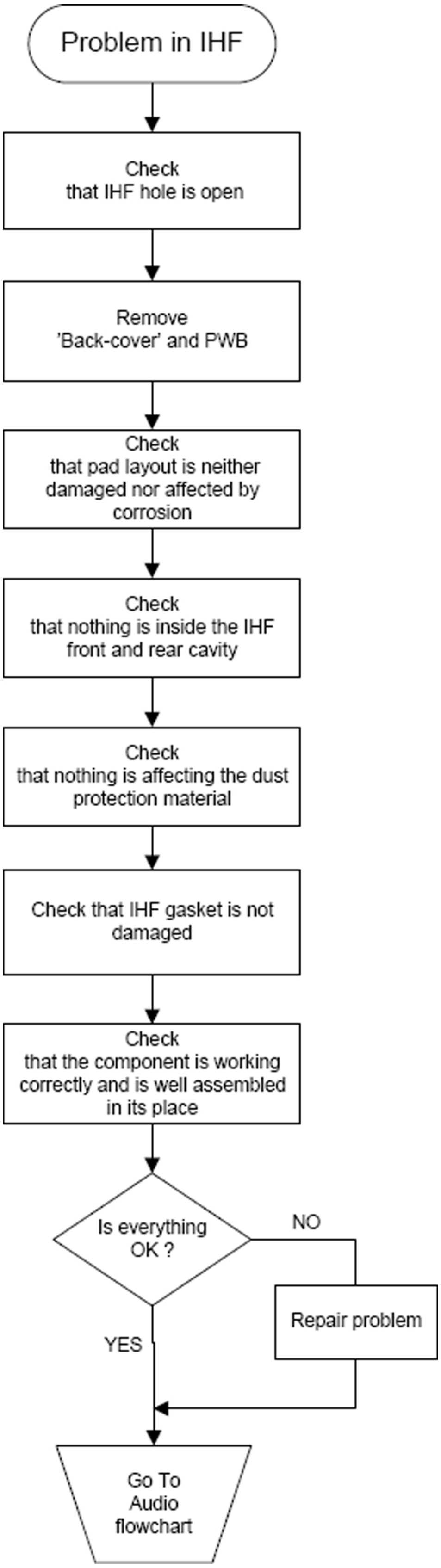
External headset earpiece troubleshooting

Troubleshooting flow


Problem in the **external earpiece (headset)**
Set Phoenix Audio routing to **Ext microphone in Ext speaker out** and activate related audio paths if necessary.
Check and clean the **PopPort contacts**. Replace PopPort if necessary.
Problem solved?
YES
NO
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal** and DC level as specified in *"Test instructions"*?
NOK
Check the audio path between **Retu** and **HSEarR P/N** and **HSEar P/N** pads. Check **L2002, L2003, R2002, R2004, C2007, C2008, C2009, C2010, R2006, R2003, R2005.** Replace components if needed.
NOK
Replace **Retu D2200** and retest.
NOK
RAPGSM faulty. Beyond economical repair.
OK
OK
OK
Does audio work **during a call**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

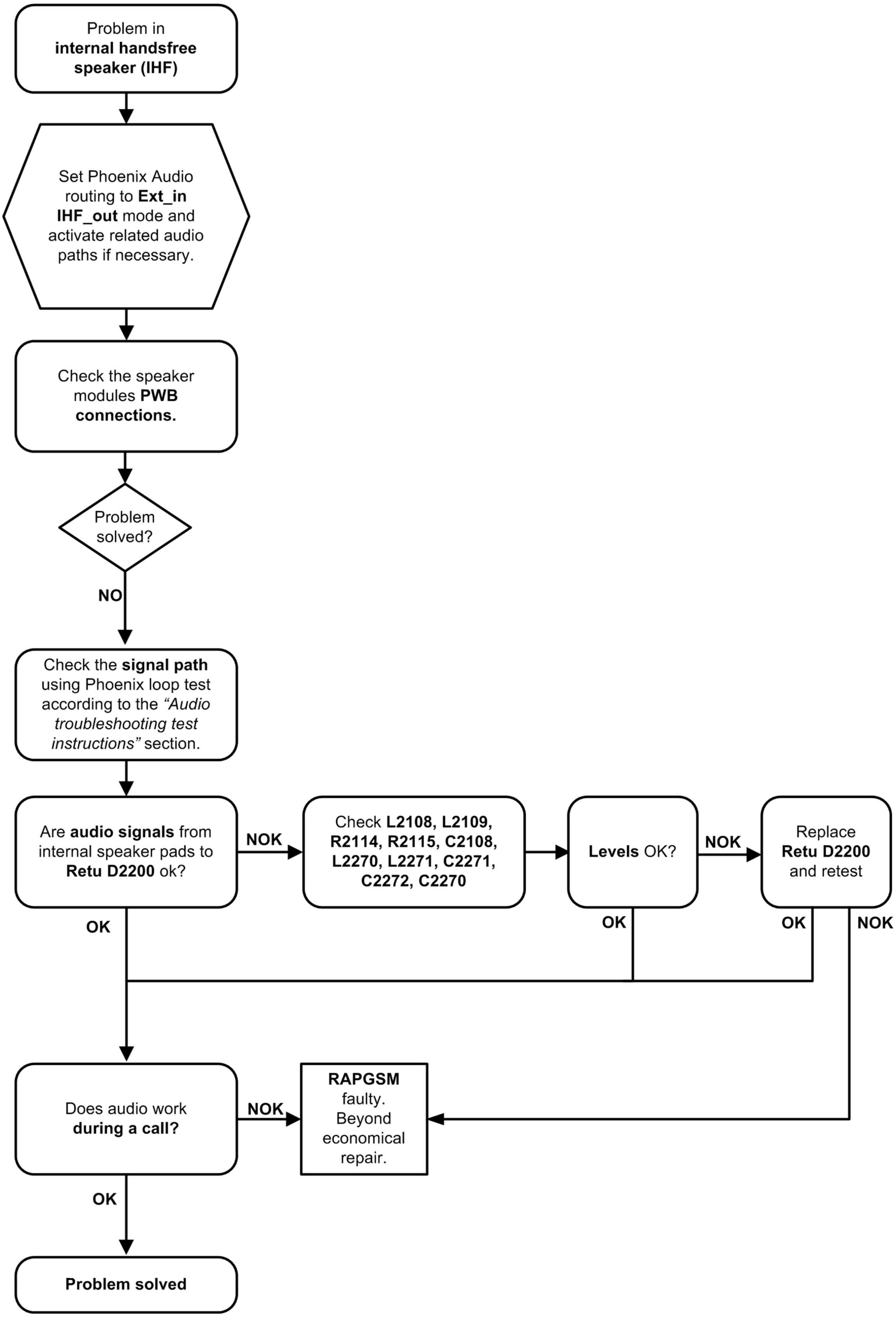
IHF troubleshooting

Troubleshooting flow


Problem in IHF
Check that IHF hole is open
Remove 'Back-cover' and PWB
Check that pad layout is neither damaged nor affected by corrosion
Check that nothing is inside the IHF front and rear cavity
Check that nothing is affecting the dust protection material
Check that IHF gasket is not damaged
Check that the component is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

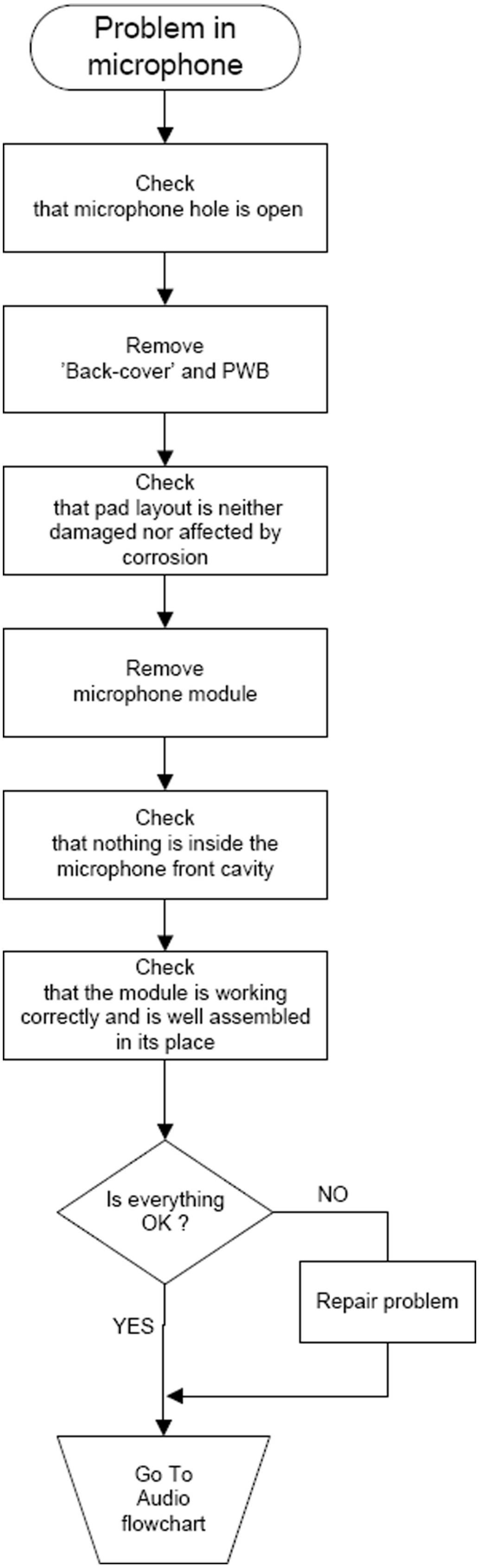
IHF troubleshooting

Troubleshooting flow


Problem in
internal handsfree speaker (IHF)
Set Phoenix Audio routing to Ext_in IHF_out mode and activate related audio paths if necessary.
Check the speaker modules PWB connections.
Problem solved?
NO
Check the signal path using Phoenix loop test according to the "Audio troubleshooting test instructions" section.
Are audio signals from internal speaker pads to Retu D2200 ok?
NOK
Check L2108, L2109, R2114, R2115, C2108, L2270, L2271, C2271, C2272, C2270
Levels OK?
NOK
Replace Retu D2200 and retest
OK
OK
OK
NOK
Does audio work during a call?
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

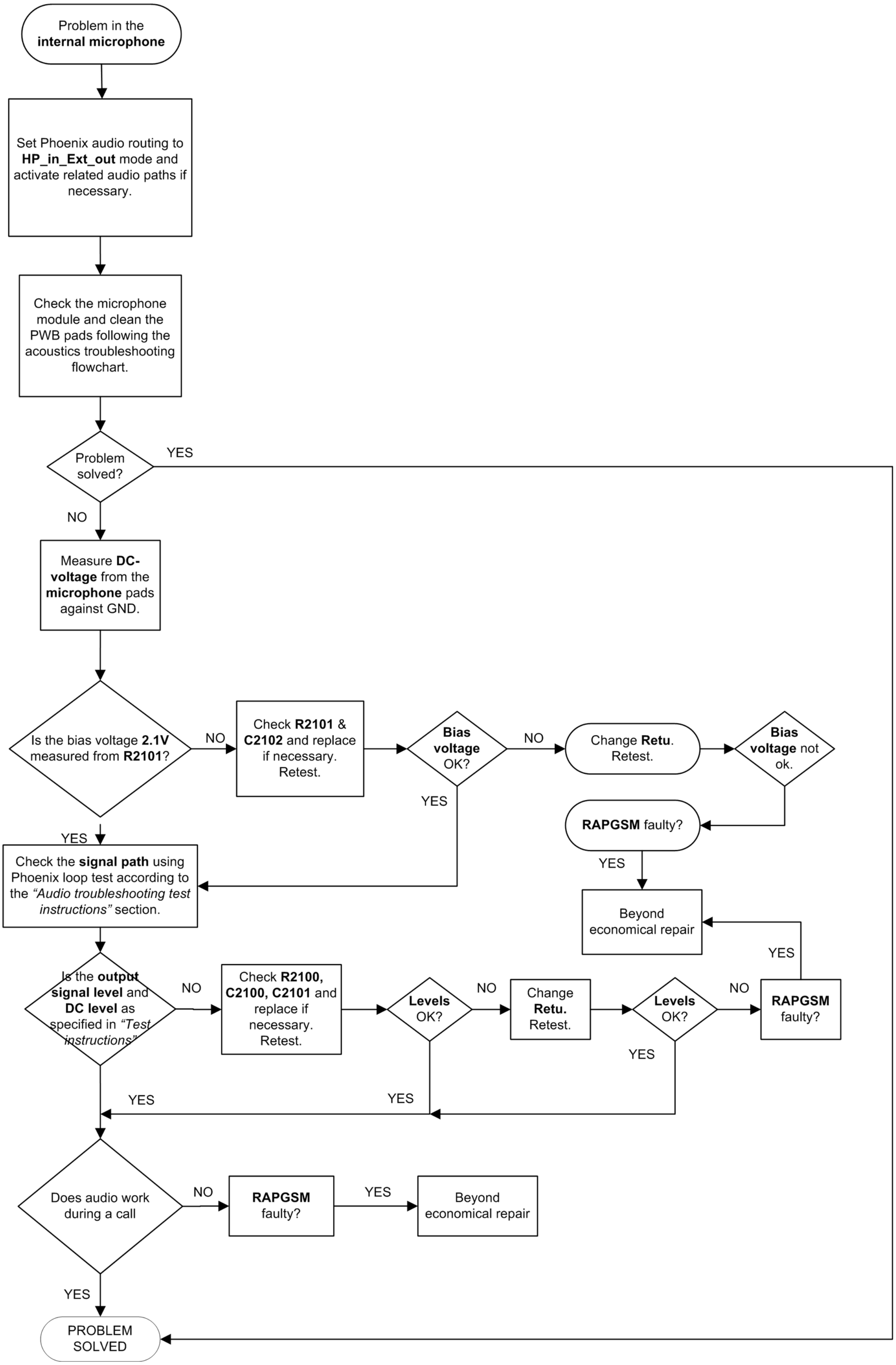
Microphone troubleshooting

Troubleshooting flow


Problem in microphone
Check that microphone hole is open
Remove 'Back-cover' and PWB
Check that pad layout is neither damaged nor affected by corrosion
Remove microphone module
Check that nothing is inside the microphone front cavity
Check that the module is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

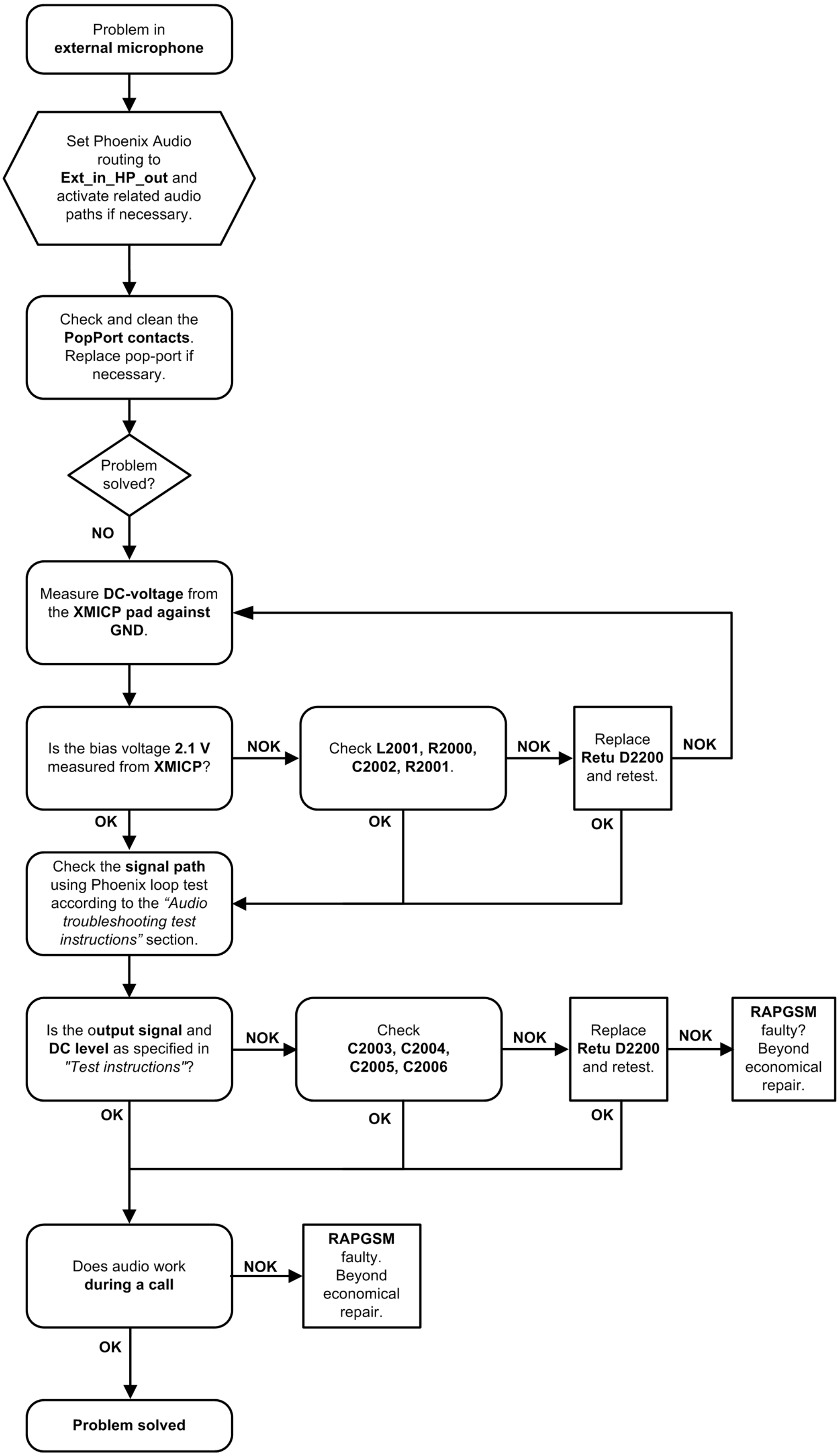
Internal microphone troubleshooting

Troubleshooting flow


Problem in the **internal microphone**
Set Phoenix audio routing to **HP_in_Ext_out** mode and activate related audio paths if necessary.
Check the microphone module and clean the PWB pads following the acoustics troubleshooting flowchart.
Problem solved?
YES
NO
Measure **DC-voltage** from the **microphone** pads against GND.
Is the bias voltage **2.1V** measured from **R2101**?
NO
Check **R2101** & **C2102** and replace if necessary. Retest.
Bias voltage OK?
NO
Change **Retu**. Retest.
Bias voltage not ok.
YES
RAPGSM faulty?
YES
Beyond economical repair
YES
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal level** and **DC level** as specified in *"Test instructions"*
NO
Check **R2100, C2100, C2101** and replace if necessary. Retest.
Levels OK?
NO
Change **Retu.** Retest.
Levels OK?
NO
RAPGSM faulty?
YES
YES
YES
YES
Does audio work during a call
NO
RAPGSM faulty?
YES
Beyond economical repair
YES
PROBLEM SOLVED

External headset microphone troubleshooting

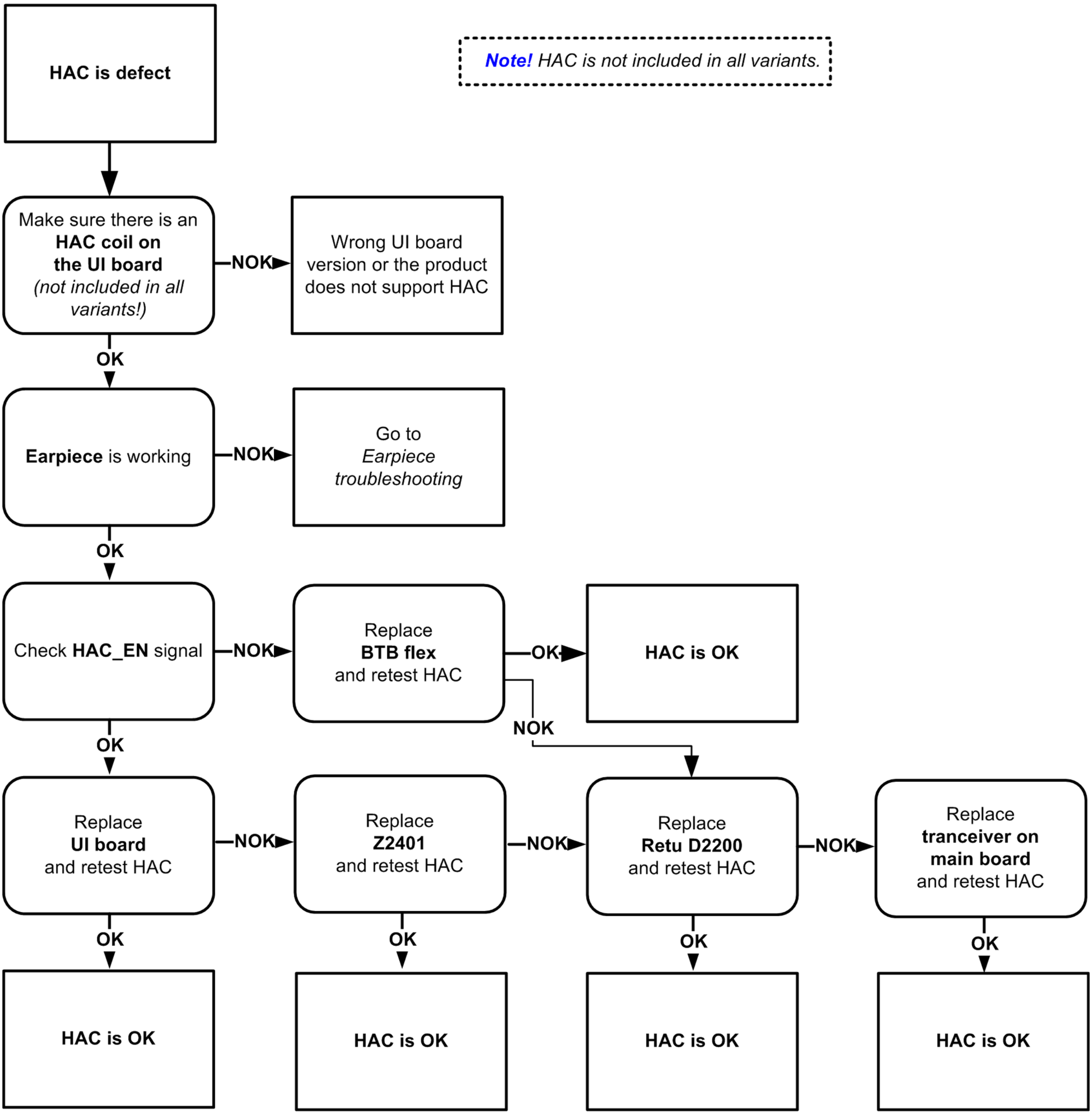
Troubleshooting flow


Problem in **external microphone**
Set Phoenix Audio routing to **Ext_in_HP_out** and activate related audio paths if necessary.
Check and clean the **PopPort contacts**. Replace pop-port if necessary.
Problem solved?
NO
Measure **DC-voltage** from the **XMICP pad against GND**.
Is the bias voltage **2.1 V** measured from **XMICP**?
NOK
Check **L2001, R2000, C2002, R2001**.
NOK
Replace **Retu D2200** and retest.
NOK
OK
OK
OK
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal** and **DC level** as specified in *"Test instructions"*?
NOK
Check **C2003, C2004, C2005, C2006**
NOK
Replace **Retu D2200** and retest.
NOK
RAPGSM faulty? Beyond economical repair.
OK
OK
OK
Does audio work **during a call**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

HAC troubleshooting

Troubleshooting flow

Note: HAC is not supported by all variants!


Note! HAC is not included in all variants.
HAC is defect
Make sure there is an HAC coil on the UI board (not included in all variants!)
NOK
Wrong UI board version or the product does not support HAC
OK
Earpiece is working
NOK
Go to Earpiece troubleshooting
OK
Check HAC_EN signal
NOK
Replace BTB flex and retest HAC
OK
HAC is OK
NOK
OK
Replace UI board and retest HAC
NOK
Replace Z2401 and retest HAC
NOK
Replace Retu D2200 and retest HAC
NOK
Replace tranceiver on main board and retest HAC
OK
HAC is OK
OK
HAC is OK
OK
HAC is OK
OK
HAC is OK

Connections troubleshooting

Bluetooth troubleshooting

Introduction to Bluetooth troubleshooting

There are two main Bluetooth (BT) problems that can occur:

Problem	Description
Detachment of the BT antenna.	This would most likely happen if the device has been dropped repeatedly to the ground. It could cause the BT antenna to become loose or partially detached from the PWB.
A malfunction in the BT ASIC, BB ASICs or the phone's BT SMD components.	This is unpredictable and could have many causes i.e. SW or HW related.

The main issue is to find out if the problem is related to the BT antenna or related to the BT system or the phone's BB and then replace/fix the faulty component. For location of the antenna, please refer to the exploded view in the Parts and layouts section.

Bluetooth settings for Phoenix

Steps

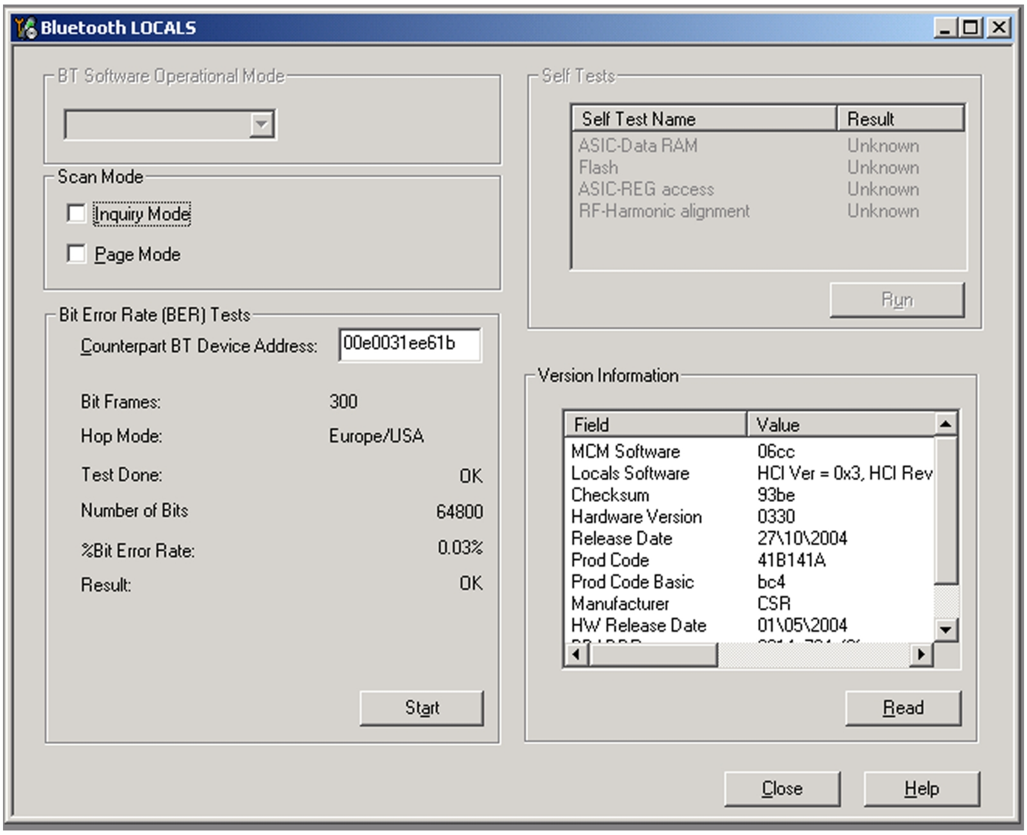
1. Start *Phoenix* service software.
2. From the **File** menu, choose **Open Product**, and then choose the correct type designator from the **Product** list.
3. Place the phone to a flash adapter in the local mode.
4. Choose **Testing**→**Bluetooth LOCALS** .
5. Locate JBT-9's serial number (12 digits) found in the type label on the back of JBT-9.

   In addition to JBT-9, also SB-6, JBT-3 and JBT-6 Bluetooth test boxes can be used.
6. In the *Bluetooth LOCALS* window, write the 12-digit serial number on the **Counterpart BT Device Address** line.

   This needs to be done only once provided that JBT-9 is not changed.
7. Place the JBT-9 box near (within 10 cm) the BT antenna and click **Run BER Test**.

Results

Bit Error Rate test result is displayed in the *Bit Error Rate (BER) Tests* pane in the *Bluetooth LOCALS* window.


Bluetooth LOCALS
BT Software Operational Mode
Scan Mode
☐ Inquiry Mode
☐ Page Mode
Bit Error Rate (BER) Tests
Start
Self Tests
Run
Version Information
Read
Close
Help

Counterpart BT Device Address: 00e0031ee61b

Bit Frames: 300

Hop Mode: Europe/USA

Test Done: OK

Number of Bits 64800

%Bit Error Rate: 0.03%

Result: OK

Self Test Name	Result
ASIC-Data RAM	Unknown
Flash	Unknown
ASIC-REG access	Unknown
RF-Harmonic alignment	Unknown

Field	Value
MCM Software	06cc
Locals Software	HCI Ver = 0x3, HCI Rev
Checksum	93be
Hardware Version	0330
Release Date	27\10\2004
Prod Code	41B141A
Prod Code Basic	bc4
Manufacturer	CSR
HW Release Date	01\05\2004

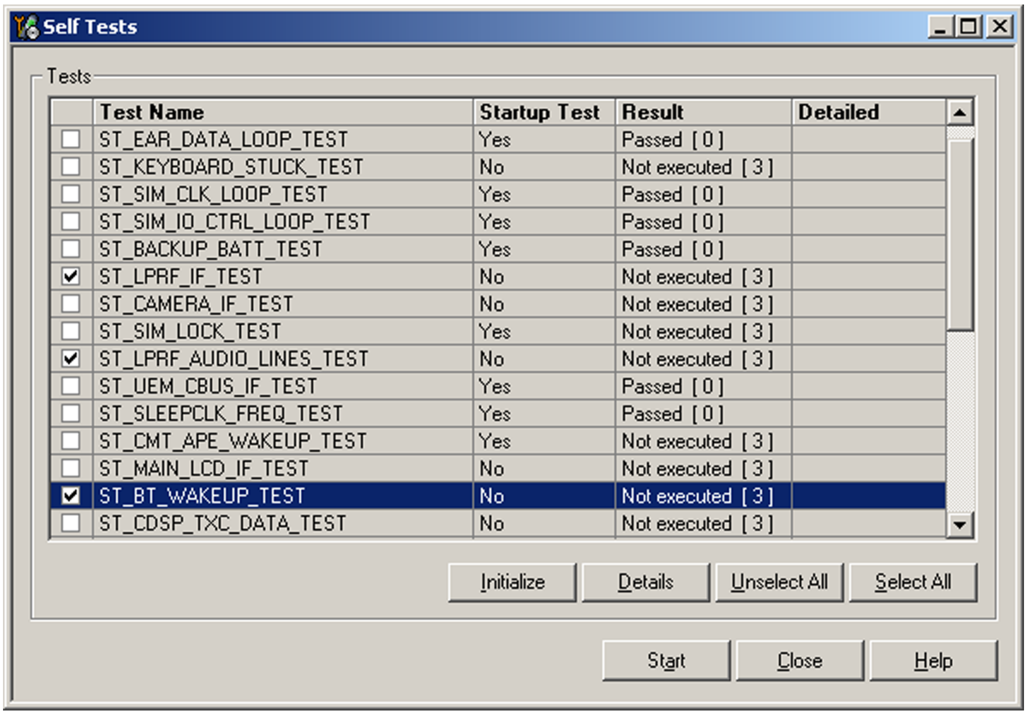
Figure 42 BER test result

Bluetooth self tests in Phoenix

Steps

1. Start *Phoenix* service software.
2. Choose**File→Scan Product.**
3. Place the phone to a flash adapter.
4. From the **Mode** drop-down menu, set mode to **Local**.
5. Choose **Testing→Self Tests.**
6. In the *Self Tests* window check the following Bluetooth related tests:
    - **ST_LPRF_IF_TEST**
    - **ST_LPRF_AUDIO_LINES_TEST**
    - **ST_BT_WAKEUP_TEST**

7. To run the tests, click **Start**.



	Test Name	Startup Test	Result	Detailed
☐	ST_EAR_DATA_LOOP_TEST	Yes	Passed [0]	
☐	ST_KEYBOARD_STUCK_TEST	No	Not executed [3]	
☐	ST_SIM_CLK_LOOP_TEST	Yes	Passed [0]	
☐	ST_SIM_IO_CTRL_LOOP_TEST	Yes	Passed [0]	
☐	ST_BACKUP_BATT_TEST	Yes	Passed [0]	
☑	ST_LPRF_IF_TEST	No	Not executed [3]	
☐	ST_CAMERA_IF_TEST	No	Not executed [3]	
☐	ST_SIM_LOCK_TEST	Yes	Not executed [3]	
☑	ST_LPRF_AUDIO_LINES_TEST	No	Not executed [3]	
☐	ST_UEM_CBUS_IF_TEST	Yes	Passed [0]	
☐	ST_SLEEPCLK_FREQ_TEST	Yes	Passed [0]	
☐	ST_CMT_APE_WAKEUP_TEST	Yes	Not executed [3]	
☐	ST_MAIN_LCD_IF_TEST	No	Not executed [3]	
☑	ST_BT_WAKEUP_TEST	No	Not executed [3]	
☐	ST_CDSP_TXC_DATA_TEST	No	Not executed [3]	

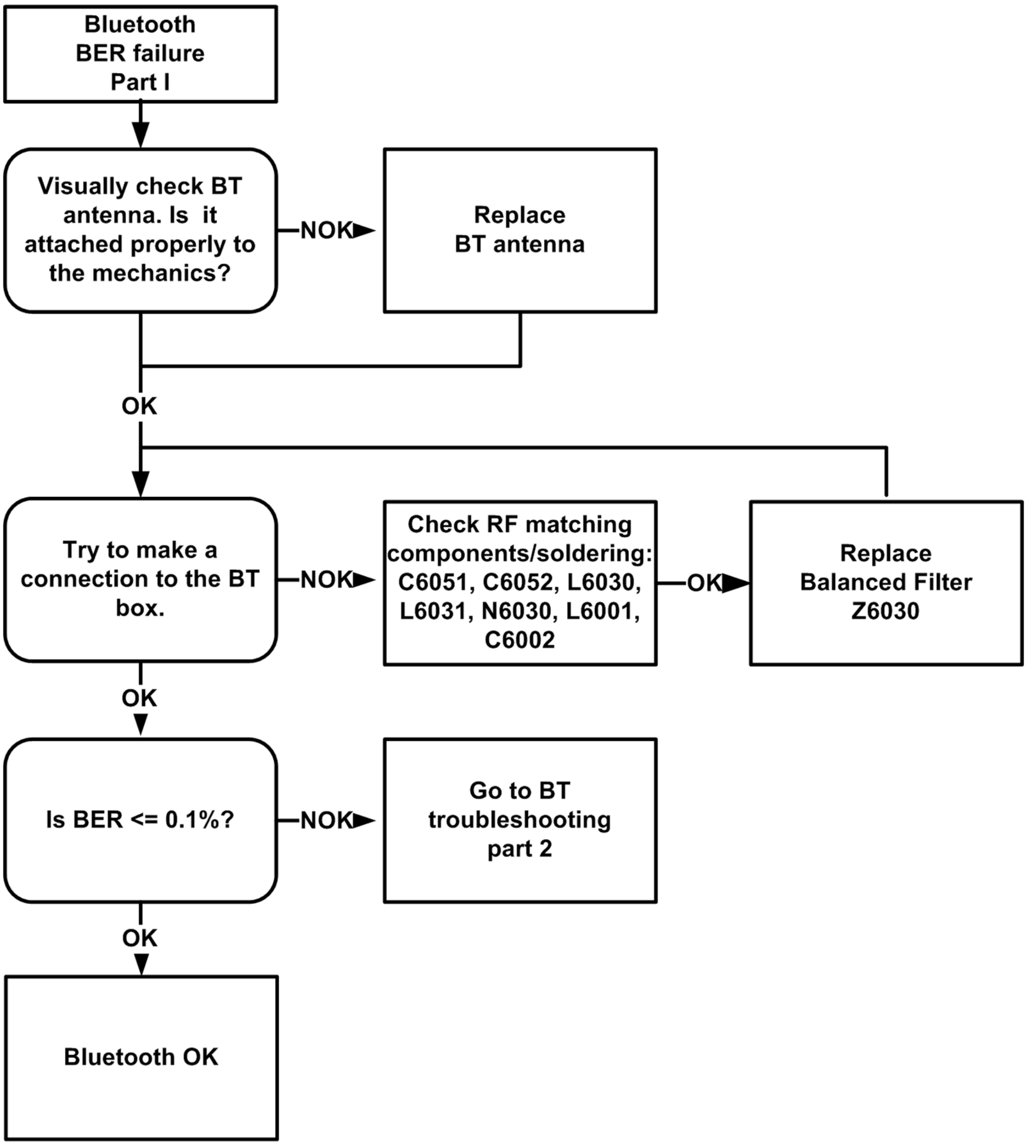
Figure 43 Bluetooth self tests in *Phoenix*

Bluetooth BER failure troubleshooting

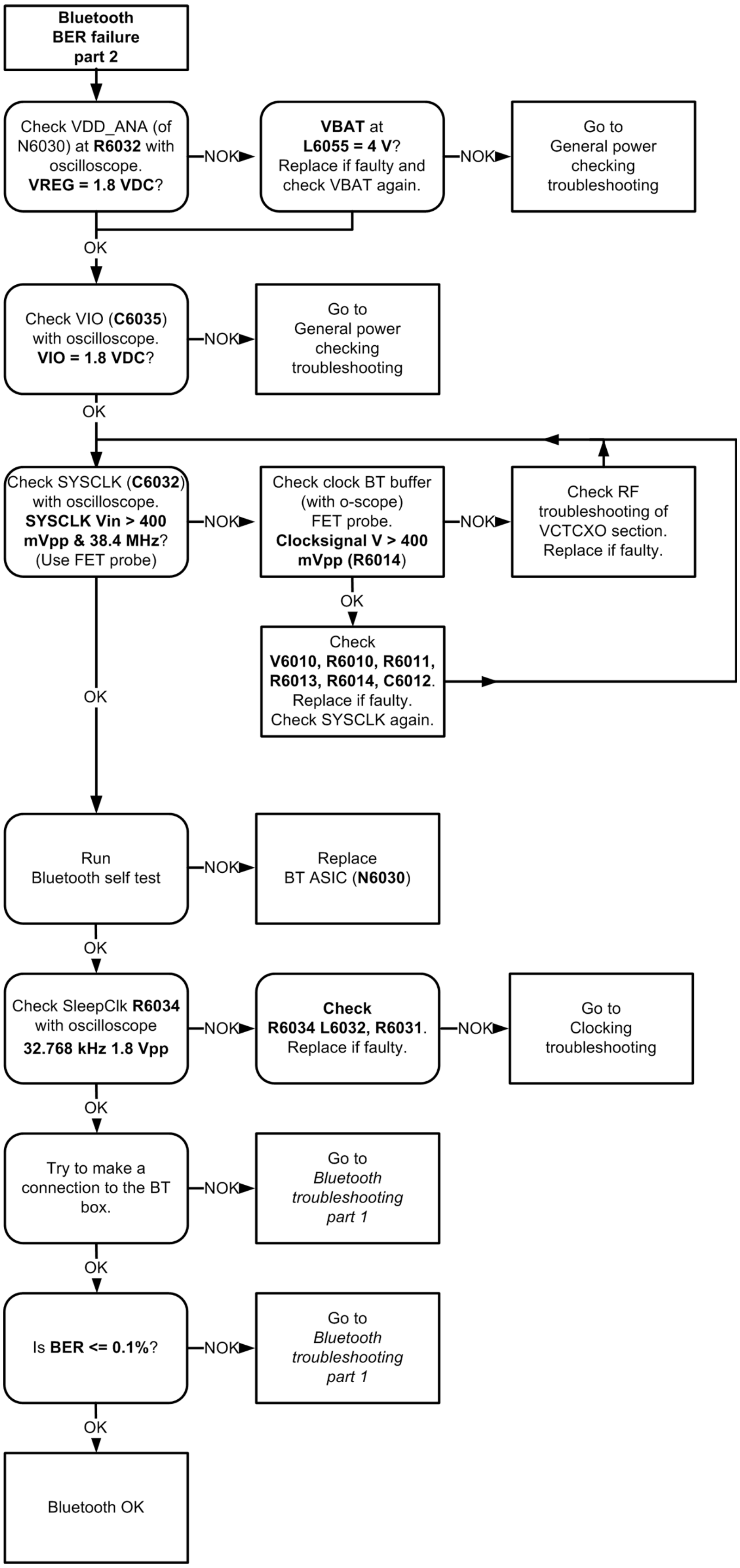
Context

Basic encoding rules, BER, is a self-identifying and self-delimiting encoding scheme, which means that each data value can be identified, extracted and decoded individually.

Part 1: Bluetooth self test passed but BER test failed

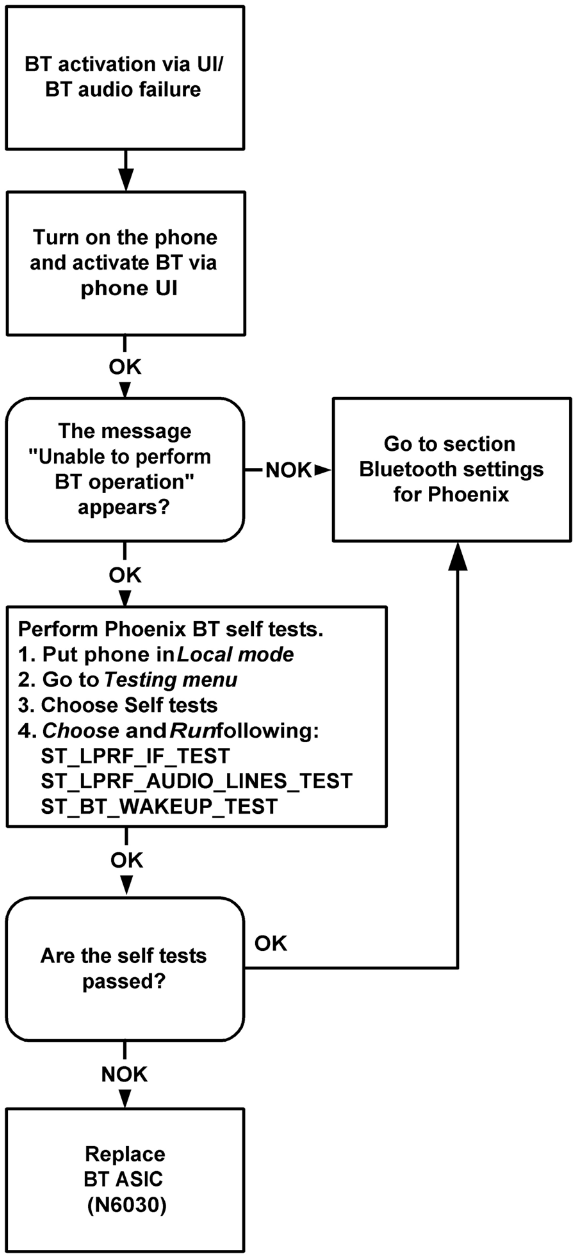

Bluetooth BER failure Part I
Visually check BT antenna. Is it attached properly to the mechanics?
NOK
Replace BT antenna
OK
Try to make a connection to the BT box.
NOK
Check RF matching components/soldering: C6051, C6052, L6030, L6031, N6030, L6001, C6002
OK
Replace Balanced Filter Z6030
OK
Is BER <= 0.1%?
NOK
Go to BT troubleshooting part 2
OK
Bluetooth OK

Part 2: Bluetooth self test failed


Bluetooth BER failure part 2
Check VDD_ANA (of N6030) at R6032 with oscilloscope. VREG = 1.8 VDC?
NOK
VBAT at L6055 = 4 V? Replace if faulty and check VBAT again.
NOK
Go to General power checking troubleshooting
OK
Check VIO (C6035) with oscilloscope. VIO = 1.8 VDC?
NOK
Go to General power checking troubleshooting
OK
Check SYSCLK (C6032) with oscilloscope. SYSCLK Vin > 400 mVpp & 38.4 MHz? (Use FET probe)
NOK
Check clock BT buffer (with o-scope) FET probe. Clocksignal V > 400 mVpp (R6014)
NOK
Check RF troubleshooting of VCTCXO section. Replace if faulty.
OK
Check V6010, R6010, R6011, R6013, R6014, C6012. Replace if faulty. Check SYSCLK again.
OK
Run Bluetooth self test
NOK
Replace BT ASIC (N6030)
OK
Check SleepClk R6034 with oscilloscope 32.768 kHz 1.8 Vpp
NOK
Check R6034 L6032, R6031. Replace if faulty.
NOK
Go to Clocking troubleshooting
OK
Try to make a connection to the BT box.
NOK
Go to Bluetooth troubleshooting part 1
OK
Is BER <= 0.1%?
NOK
Go to Bluetooth troubleshooting part 1
OK
Bluetooth OK

Bluetooth audio and UI activation troubleshooting

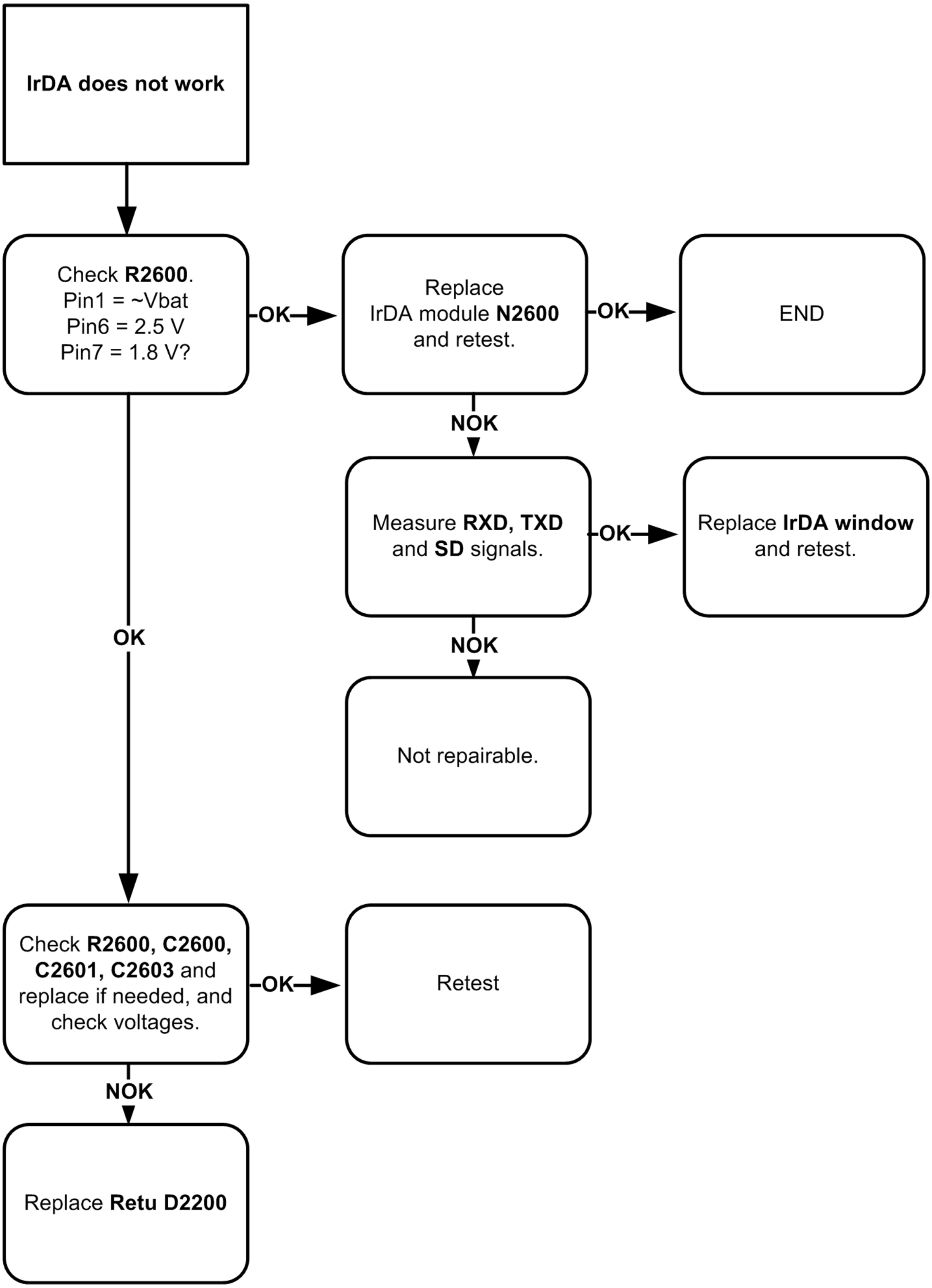
Troubleshooting flow


BT activation via UI/
BT audio failure
Turn on the phone and activate BT via phone UI
OK
The message "Unable to perform BT operation" appears?
NOK
Go to section Bluetooth settings for Phoenix
OK
Perform Phoenix BT self tests.
1. Put phone in *Local mode*
2. Go to *Testing menu*
3. Choose Self tests
4. *Choose* and *Run* following:
ST_LPRF_IF_TEST
ST_LPRF_AUDIO_LINES_TEST
ST_BT_WAKEUP_TEST
OK
Are the self tests passed?
OK
NOK
Replace BT ASIC (N6030)

IrDA troubleshooting

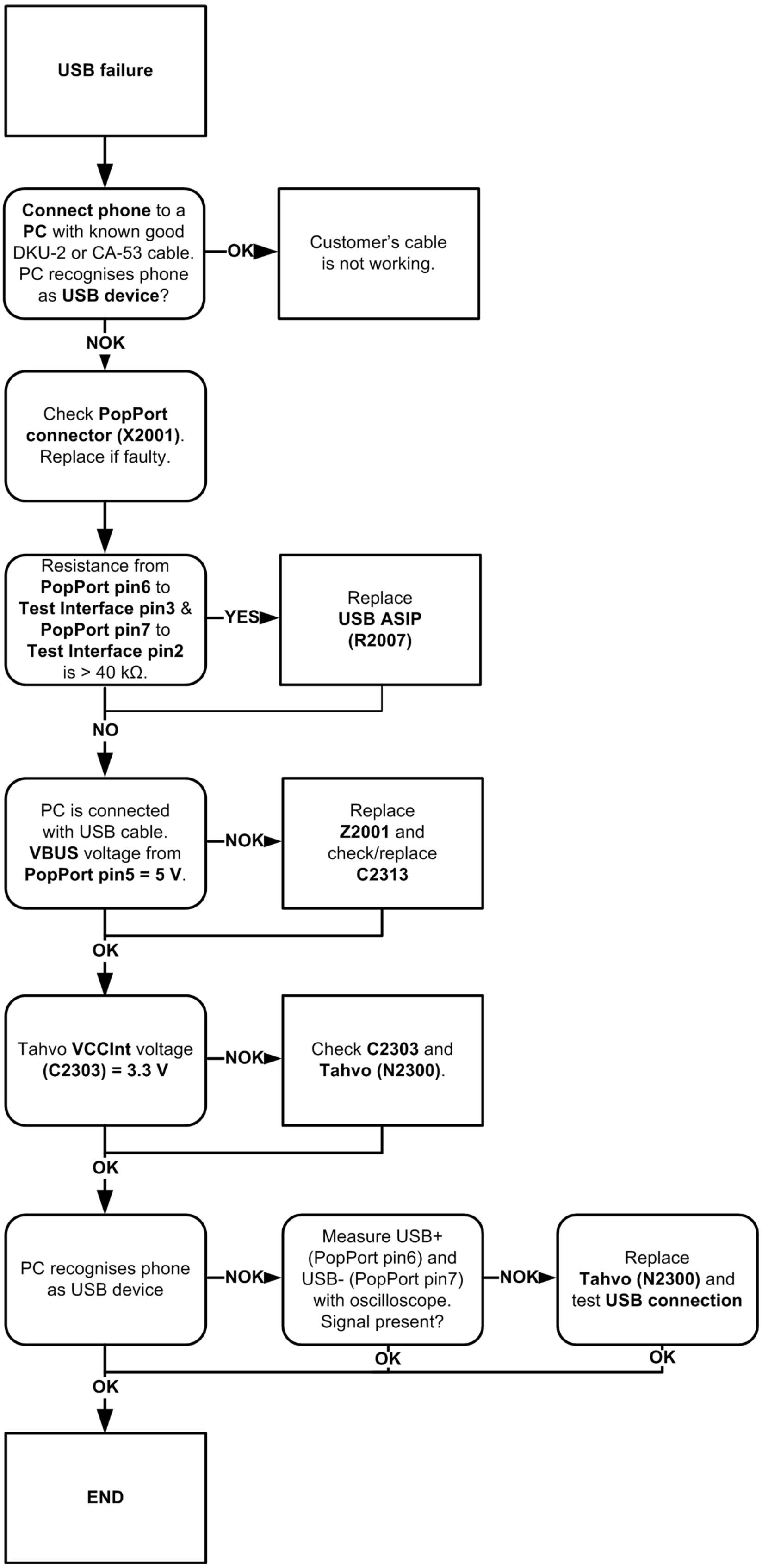
Troubleshooting flow

Note: IrDA is not supported by all variants!


IrDA does not work
Check **R2600**.
Pin1 = ~Vbat
Pin6 = 2.5 V
Pin7 = 1.8 V?
OK
Replace
IrDA module **N2600**
and retest.
OK
END
NOK
Measure **RXD, TXD**
and **SD** signals.
OK
Replace **IrDA window**
and retest.
NOK
Not repairable.
OK
Check **R2600, C2600, C2601, C2603** and replace if needed, and check voltages.
OK
Retest
NOK
Replace **Retu D2200**

USB troubleshooting

Troubleshooting flow


USB failure
Connect phone to a PC with known good DKU-2 or CA-53 cable. PC recognises phone as USB device?
OK
Customer's cable is not working.
NOK
Check PopPort connector (X2001). Replace if faulty.
Resistance from PopPort pin6 to Test Interface pin3 & PopPort pin7 to Test Interface pin2 is > 40 kΩ.
YES
Replace USB ASIP (R2007)
NO
PC is connected with USB cable. VBUS voltage from PopPort pin5 = 5 V.
NOK
Replace Z2001 and check/replace C2313
OK
Tahvo VCCInt voltage (C2303) = 3.3 V
NOK
Check C2303 and Tahvo (N2300).
OK
PC recognises phone as USB device
NOK
Measure USB+ (PopPort pin6) and USB- (PopPort pin7) with oscilloscope. Signal present?
NOK
Replace Tahvo (N2300) and test USB connection
OK
OK
OK
END

Baseband manual tuning guide

Certificate restoring for BB5.0 products

Context

This procedure is performed when the device certificate is corrupted for some reason.

All tunings (RF & Baseband, UI) must be done after performing the certificate restoring procedure.

The procedure for certificate restoring is the following:

- Flash the phone with the latest available software using FPS-8 or FPS-10.

  Note: USB flashing does not work for a dead BB5.0 phone.
- Create a request file.
- Send the file to Nokia by e-mail. Use the following addresses depending on your location:
  - APAC: sydney.service@nokia.com
  - CHINA: repair.ams@nokia.com
  - E&A: salo.repair@nokia.com
  - AMERICAS: fls1.usa@nokia.com
- When you receive a reply from Nokia, carry out certificate restoring.
- Tune the phone completely.

  Note: SX-4 smart card is needed.
- If the phone resets after certificate restoring, reflash the phone again.

Required equipment and setup:

- *Phoenix* service software v 2004.39.7.70 or newer.
- The latest phone model specific *Phoenix* data package.
- PKD-1 dongle
- SX-4 smart card (Enables BB5.0 testing and tuning features)
- External smart card reader

  Note: The smart card reader is only needed when FPS-8 is used. FPS-10 has an integrated smart card reader.
- Activated FPS-8 flash prommer **OR** FPS-10 flash prommer
- Flash update package 03.18.004 or newer for FPS-8 or FPS-10 flash prommers
- CU-4 control unit
- USB cable from PC USB Port to CU-4 control unit
- Phone model specific adapter for CU-4 control unit
- PCS-1 cable to power CU-4 from external power supply
- XCS-4 modular cable between flash prommer and CU-4

  Note: CU-4 must be supplied with +12 V from an external power supply in all steps of certificate restoring.

Steps

1. Program the phone software.
   i Start *Phoenix* and login. Make sure the connection has been managed correctly for FPS-8 or FPS-10.

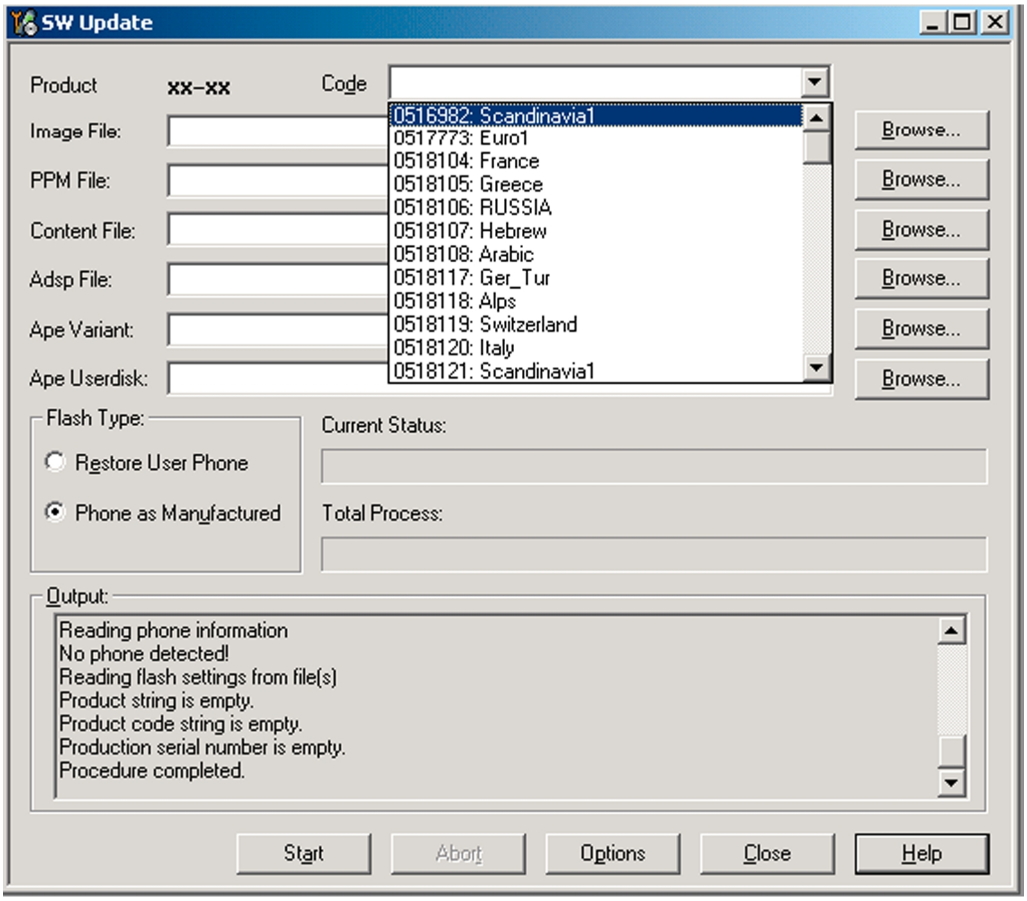
ii Update the phone MCU software to the latest available version.

If the new flash is empty and the phone cannot communicate with *Phoenix*, reflash the phone.

iii Choose the product manually from **File→Open Product** , and click **OK**.

Wait for the phone type designator (e.g. “RM-1”) to be displayed in the status bar.

iv Go to **Flashing→SW Update** and wait until *Phoenix* reads the product data as shown in the following picture.


SW Update
Image File:
PPM File:
Content File:
Adsp File:
Ape Variant:
Ape Userdisk:
Browse...
Browse...
Browse...
Browse...
Browse...
Browse...
Flash Type:
Restore User Phone
Current Status:
Total Process:
Output:
Start
Abort
Options
Close
Help

Product xx-xx

Code

0516982: Scandinavia1
0517773: Euro1
0518104: France
0518105: Greece
0518106: RUSSIA
0518107: Hebrew
0518108: Arabic
0518117: Ger_Tur
0518118: Alps
0518119: Switzerland
0518120: Italy
0518121: Scandinavia1

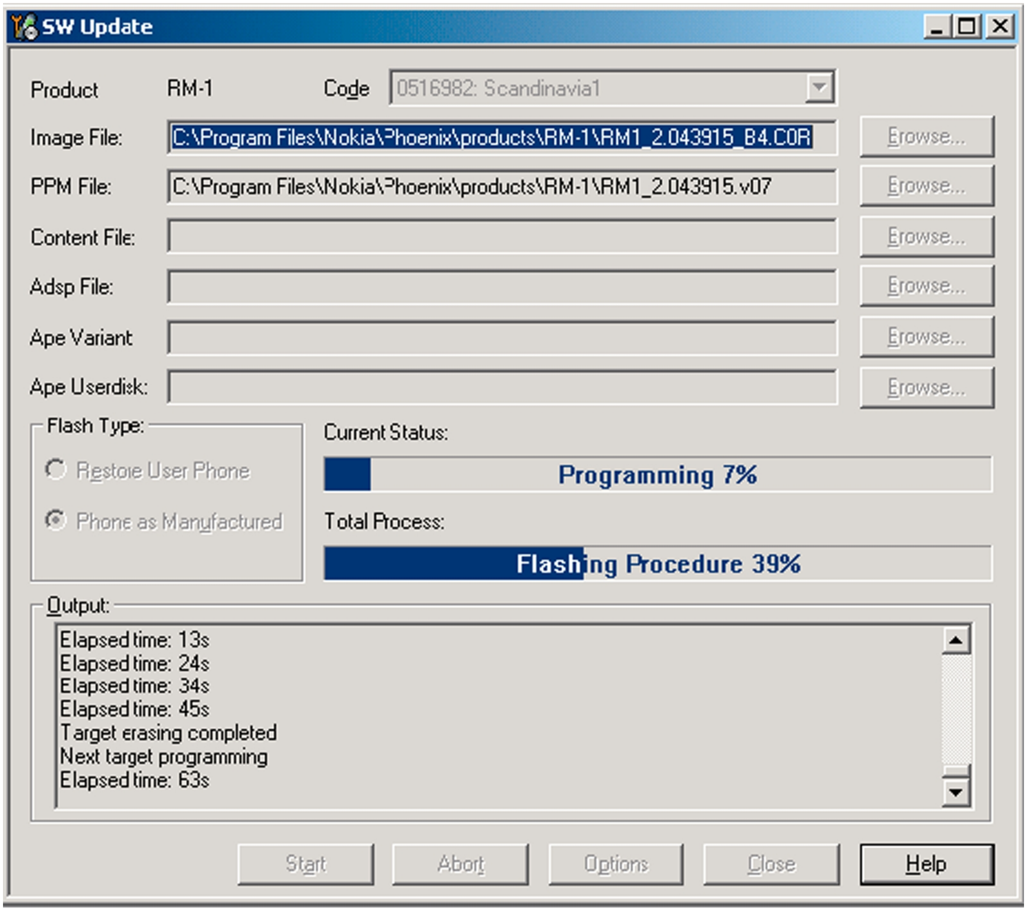
Flash Type: ○ Restore User Phone ● Phone as Manufactured

```
Reading phone information
No phone detected!
Reading flash settings from file(s)
Product string is empty.
Product code string is empty.
Production serial number is empty.
Procedure completed.
```

Product	is automatically set according to the phone support module which was opened manually, but the flash files cannot be found because the correct data cannot be read from the phone automatically.
Code	must be chosen manually, it determines the correct flash files to be used. Please choose the correct product code (can be seen in the phone type label) from the dropdown list.
Flash Type	must be set to **Phone as Manufactured**.

v To continue, click **Start**.

Progress bars and messages on the screen show actions during phone programming, please wait.


SW Update
Browse...
Browse...
Browse...
Browse...
Browse...
Browse...
Start
Abort
Options
Close
Help

Product RM-1
Code 0516982: Scandinavia1
Image File: C:\Program Files\Nokia\Phoenix\products\RM-1\RM1_2.043915_B4.C0R
PPM File: C:\Program Files\Nokia\Phoenix\products\RM-1\RM1_2.043915.v07
Content File:
Adsp File:
Ape Variant
Ape Userdisk:
Flash Type:
○ Restore User Phone
● Phone as Manufactured
Current Status: Programming 7%
Total Process: Flashing Procedure 39%
Output:

```
Elapsed time: 13s
Elapsed time: 24s
Elapsed time: 34s
Elapsed time: 45s
Target erasing completed
Next target programming
Elapsed time: 63s
```

Programming is completed when *Flashing Completed* message is displayed.

The product type designator and MCU SW version are displayed in the status bar.

vi Close the *SW Update* window and then choose **File→Close Product** .

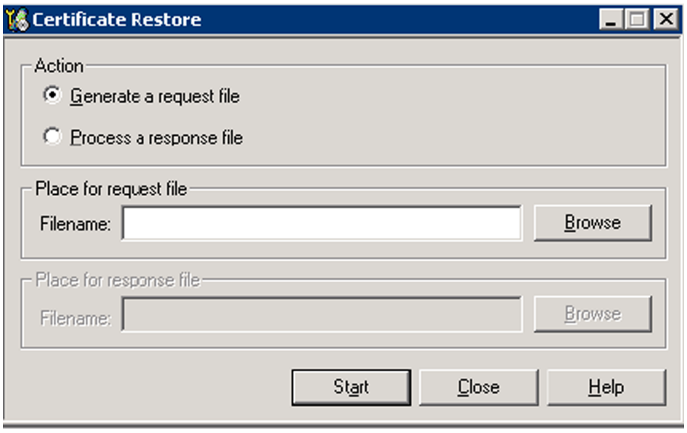
2. Create a *Request* file.

For this procedure, you must supply +12 V to CU-4 from an external power supply.

i To connect the phone with *Phoenix*, choose **File→Scan Product** .

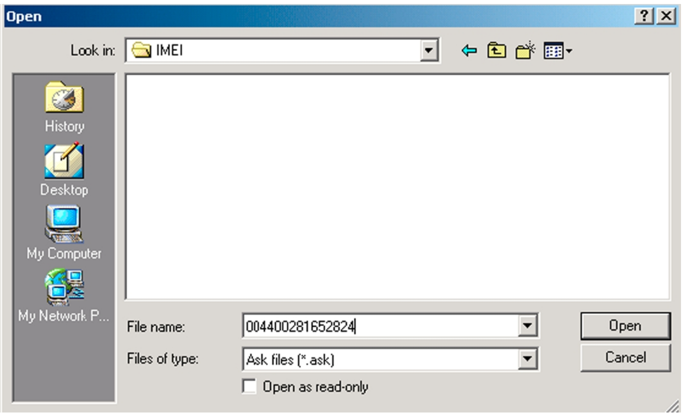
ii Choose **Tools→Certificate Restore** .

iii To choose a location for the request file, click **Browse**.


Certificate Restore
Browse
Browse
Start
Close
Help

Action
● Generate a request file
○ Process a response file
Place for request file
Filename:
Place for response file
Filename:

iv Name the file so that you can easily identify it, and click **Open**.



Open

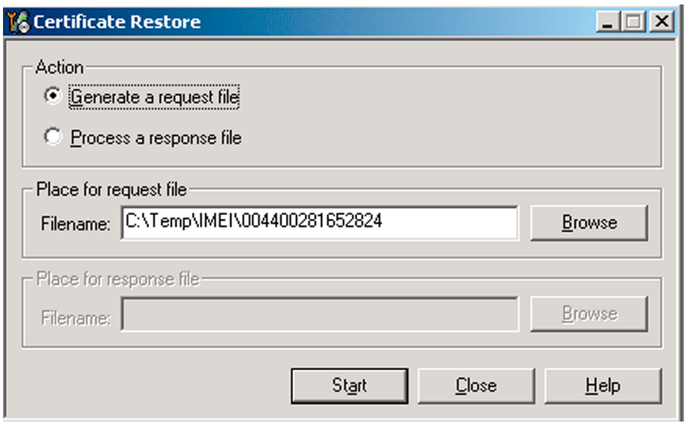
Look in: IMEI

File name: 004400281652824

Files of type: Ask files (*.ask)

☐ Open as read-only

The name of the file and its location are shown.



Certificate Restore

Action

● Generate a request file

○ Process a response file

Place for request file

Filename: C:\Temp\IMEI\004400281652824

Place for response file

Filename:

v To create the *Request* file, click **Start**.

vi When the file for certificate restore has been created, send it to Nokia as an e-mail attachment.

3. Restore certificate.

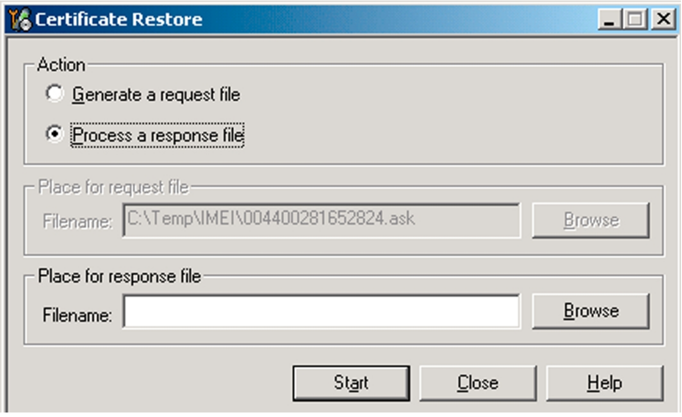
For this procedure, you must supply +12 V to CU-4 from an external power supply.

i Save the reply file sent by Nokia to your computer.

ii Start *Phoenix* service software.

iii Choose **File→Scan Product** .

iv From the **Tools** menu, choose **Certificate Restore** and select **Process a response file** in the *Action* pane.


Certificate Restore
Browse
Browse
Start
Close
Help

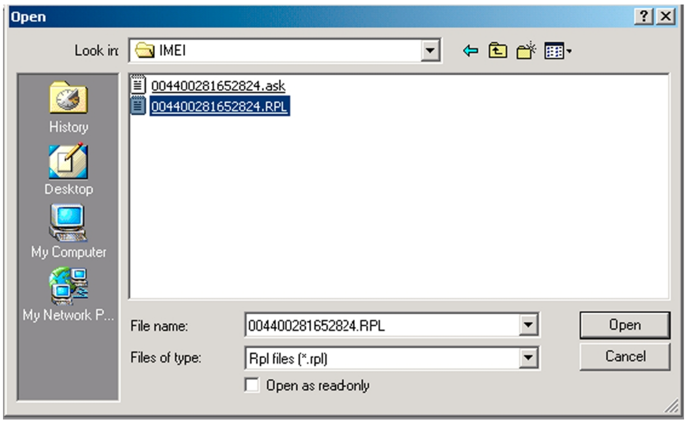
Action
○ Generate a request file
● Process a response file

Place for request file
Filename: C:\Temp\IMEI\004400281652824.ask

Place for response file
Filename:

v To choose the location where response file is saved, click **Browse**.

vi Click **Open**.


Open
History
Desktop
My Computer
My Network P...
Open
Cancel

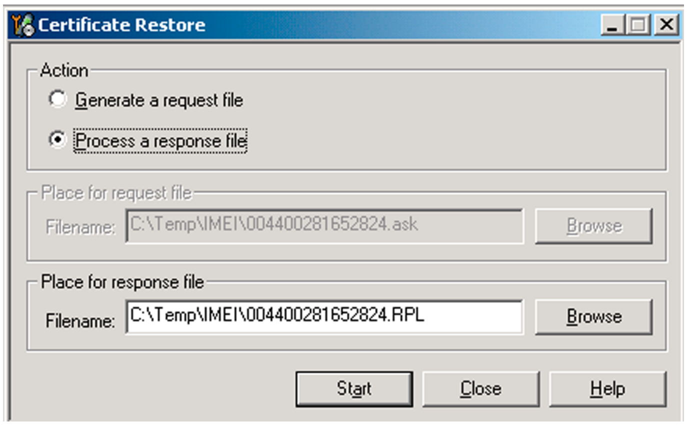
Look in: IMEI

004400281652824.ask
004400281652824.RPL

File name: 004400281652824.RPL
Files of type: Rpl files (*.rpl)
☐ Open as read-only

The name of the file and the path where it is located are shown.

vii To write the file to phone, click **Start**.


Certificate Restore
Browse
Browse
Start
Close
Help

Action
○ Generate a request file
● Process a response file

Place for request file
Filename: C:\Temp\IMEI\004400281652824.ask

Place for response file
Filename: C:\Temp\IMEI\004400281652824.RPL

Next action

After a successful rewrite, you must retune the phone completely by using *Phoenix* tuning functions.

Important: Perform all tunings: RF, BB, and UI.

Energy management calibration

Before you begin

Energy Management (EM) calibration is performed to calibrate the setting (gain and offset) of AD converters in several channels (that is, **battery voltage**, **BSI**, **battery current**) to get an accurate AD conversion result.

Hardware setup:

- An external power supply is needed.
- Supply 12V DC from an external power supply to CU-4 to power up the phone.
- The phone must be connected to a CU-4 control unit with a product-specific flash adapter.

Steps

1. Place the phone to the docking station adapter (CU-4 is connected to the adapter).
2. Start *Phoenix* service software.
3. Choose **File**→ **Scan Product.**
4. Choose **Tuning**→**Energy Management Calibration.**
5. To show the current values in the phone memory, click **Read**, and check that communication between the phone and CU-4 works.
6. Check that the **CU-4 used** check box is checked.
7. Select the item(s) to be calibrated.

   Note: ADC calibration has to be performed before other item(s). However, if all calibrations are selected at the same time, there is no need to perform the ADC calibration first.
8. Click **Calibrate**.

   The calibration of the selected item(s) is carried out automatically.

   The candidates for the new calibration values are shown in the *Calculated values* column. If the new calibration values seem to be acceptable (please refer to the following "Calibration value limits" table), click **Write** to store the new calibration values to the phone permanent memory.

Table 12 Calibration value limits

Parameter	Min.	Max.
ADC Offset	-20	20
ADC Gain	12000	14000
BSI Gain	1100	1300
VBAT Offset	2400	2650
VBAT Gain	19000	23000
VCHAR Gain	N/A	N/A
IBAT (ICal) Gain	7750	12250

9. Click **Read**, and confirm that the new calibration values are stored in the phone memory correctly. If the values are not stored to the phone memory, click **Write** and/or repeat the procedure again.
10. To end the procedure, close the *Energy Management Calibration* window.

(This page left intentionally blank.)

7 — RF Troubleshooting and Manual Tuning Guide

(This page left intentionally blank.)

Table of Contents

Introduction to RF troubleshooting....7–5
RF key components....7–6
Receiver troubleshooting....7–6
  Introduction to RX troubleshooting....7–6
  General instructions for RX troubleshooting....7–7
  Receiver (RX) troubleshooting....7–8
  GSM Rx chain activation for manual measurements / GSM RSSI measurement....7–11
Transmitter troubleshooting....7–11
  General instructions for TX troubleshooting....7–11
  Transceiver (TX) troubleshooting....7–14
  Checking antenna functionality....7–15
Synthesizer troubleshooting....7–16
RF tunings....7–17
  Introduction to RF tunings....7–17
  Auto tuning for BB5.0....7–17
System mode independent manual tunings....7–18
  RF channel filter calibration....7–18
  PA (power amplifier) detection....7–19
GSM receiver tunings....7–19
  Rx calibration (GSM)....7–19
  Rx band filter response compensation (GSM)....7–22
GSM transmitter tunings....7–25
  Tx IQ tuning (GSM)....7–25
  Tx power level tuning (GSM)....7–27

List of Tables

Table 13 Rf channel filter calibration tuning limits....7–18
Table 14 RF tuning limits in Rx calibration....7–21

List of Figures

Figure 44 RF key components, top side main board....7–6
Figure 45 RF Controls window....7–8
Figure 46 RSSI Reading window....7–11
Figure 47 RF Controls window....7–13
Figure 48 Antenna module....7–15
Figure 49 Auto tuning concept with CMU200....7–17
Figure 50 Rf channel filter calibration typical values....7–18

(This page left intentionally blank.)

Introduction to RF troubleshooting

On the following pages you will find a step-by-step troubleshooting procedure and reference measurements at the relevant signal points. For functional descriptions, please refer to the System module section.

Notes on reference measurements

All measurements must be done using:

- spectrum analyser with a high-frequency high-impedance passive probe (LO-/reference frequencies and RF power levels)
- oscilloscope with a 10:1 probe (DC-voltages and low frequency signals)

Important: All measurements with an RF coupler must be performed in an RF shielded environment, or where there are no transmissions on the same frequencies. This may disturb sensitive receiver measurements.

Repairing this phone - important

The RF section of the phone is built around one RF ASIC. Before changing the RF ASIC, please make sure that supply voltages and serial communication coming from baseband to RF are OK.

Please note that the grounding of the FEM module is directly below the FEM module. Therefore, it is difficult to check or change the module.

Most RF semiconductors are static discharge sensitive! ESD protection must be taken care of during repair (ground straps and ESD soldering irons). The RF ASIC and FEM are moisture sensitive, so parts must be pre-baked prior to soldering.

In addition to key components, there are lot of discrete components (resistors, inductors and capacitors) which troubleshooting is done mainly by checking if the soldering of the component is done properly.

Capacitor can be checked for shorts and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully.

Keep in mind that all measured voltages or RF levels depicted in the service manual are rough figures. Especially RF levels vary because of different measuring equipment or different grounding of the probe used.

When using an RF probe, use a pair of metallic tweezers to connect the probe ground to the PWB ground as close to the measurement point as possible. If measurements are performed in a product specific module jig, then “GND” pads should be used for the probe ground.

RF key components

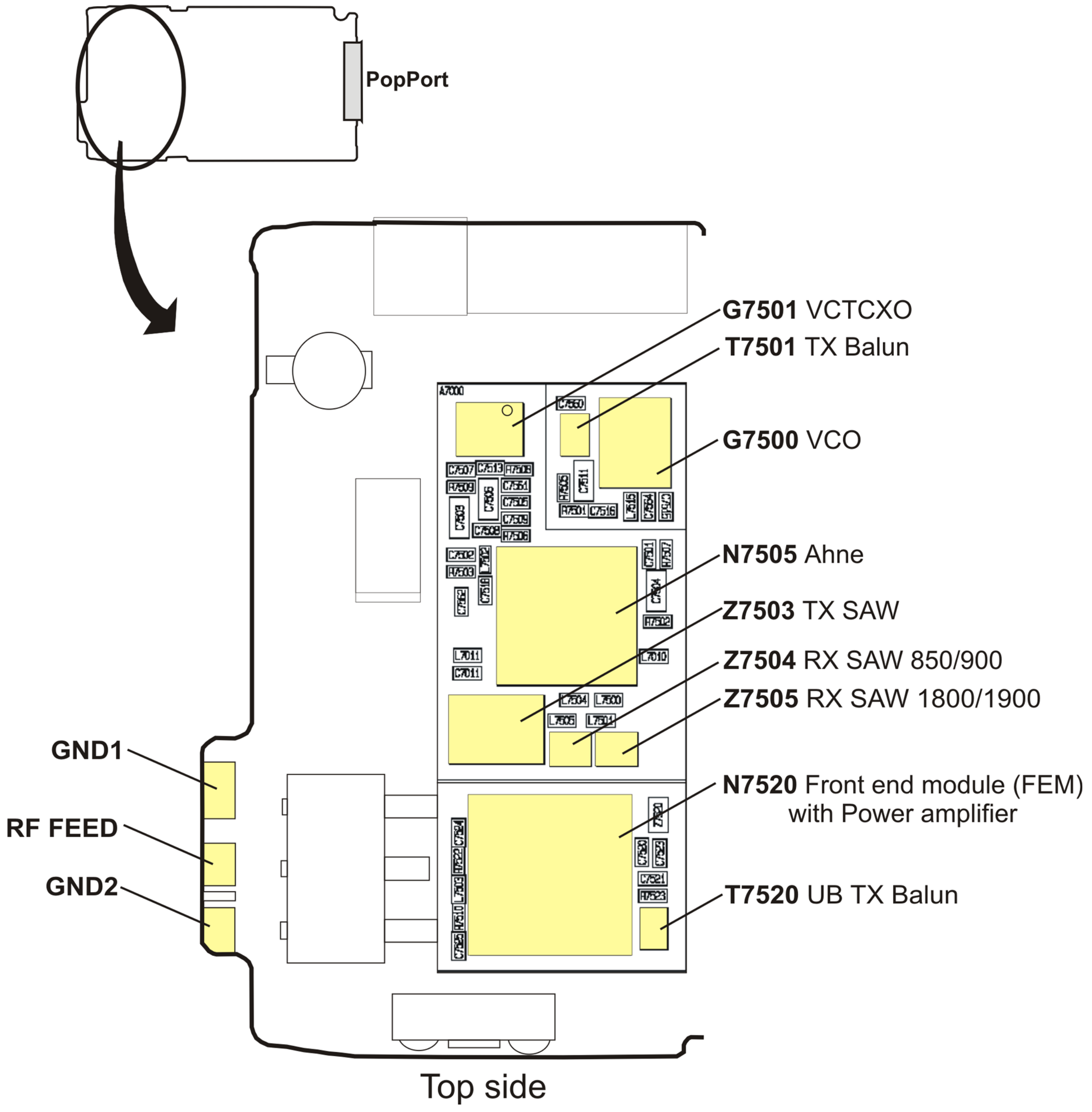

PopPort
G7501 VCTCXO
T7501 TX Balun
G7500 VCO
N7505 Ahne
Z7503 TX SAW
Z7504 RX SAW 850/900
Z7505 RX SAW 1800/1900
N7520 Front end module (FEM) with Power amplifier
T7520 UB TX Balun
GND1
RF FEED
GND2
A7000
Top side

Figure 44 RF key components, top side main board

Receiver troubleshooting

Introduction to RX troubleshooting

Rx can be tested by making a phone call or in the local mode. For the local mode testing, use Phoenix service software.

The main Rx troubleshooting measurement is RSSI measurement. This test measures the signal strength of the received signal. I and Q branches can be measured separately.

In GSM, the input signal can be either a real GSM signal or a CW signal that is 67.771kHz up from the carrier frequency.

For service tool usage instructions, refer to section Service Tools and Service Concepts.

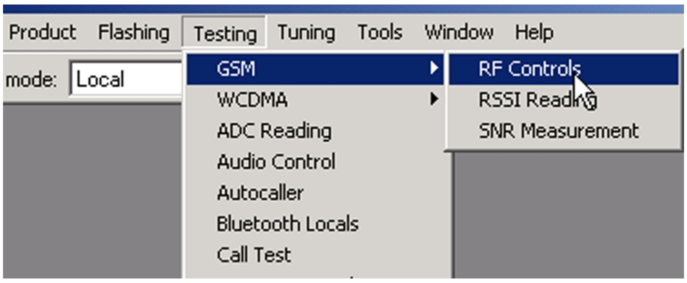
General instructions for RX troubleshooting

Steps

1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

   Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-82) and measurement equipment or alternatively use a 50 Ω (at least 2 W) dummy load in the module test jig RF connector, otherwise the RF part may be damaged.

   Note: Make sure that all connections are made to the correct RF connector.
4. Set Rx on.
   - i Set the phone module to the test jig and start *Phoenix service software*.
   - ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10_USB or FPS10_TCP drivers, depending on connection type. When using DAU-9S select FBUS).
   - iii From the File menu, choose product: **File -> Choose Product -> xx-x*** (* = type designator of the phone, eg. RM-115/126), or press **Ctrl + R** to scan product.
   - iv From the toolbar, set operating mode to “Local”.
5. EGSM850/900/1800/1900 troubleshooting
   - i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls** .



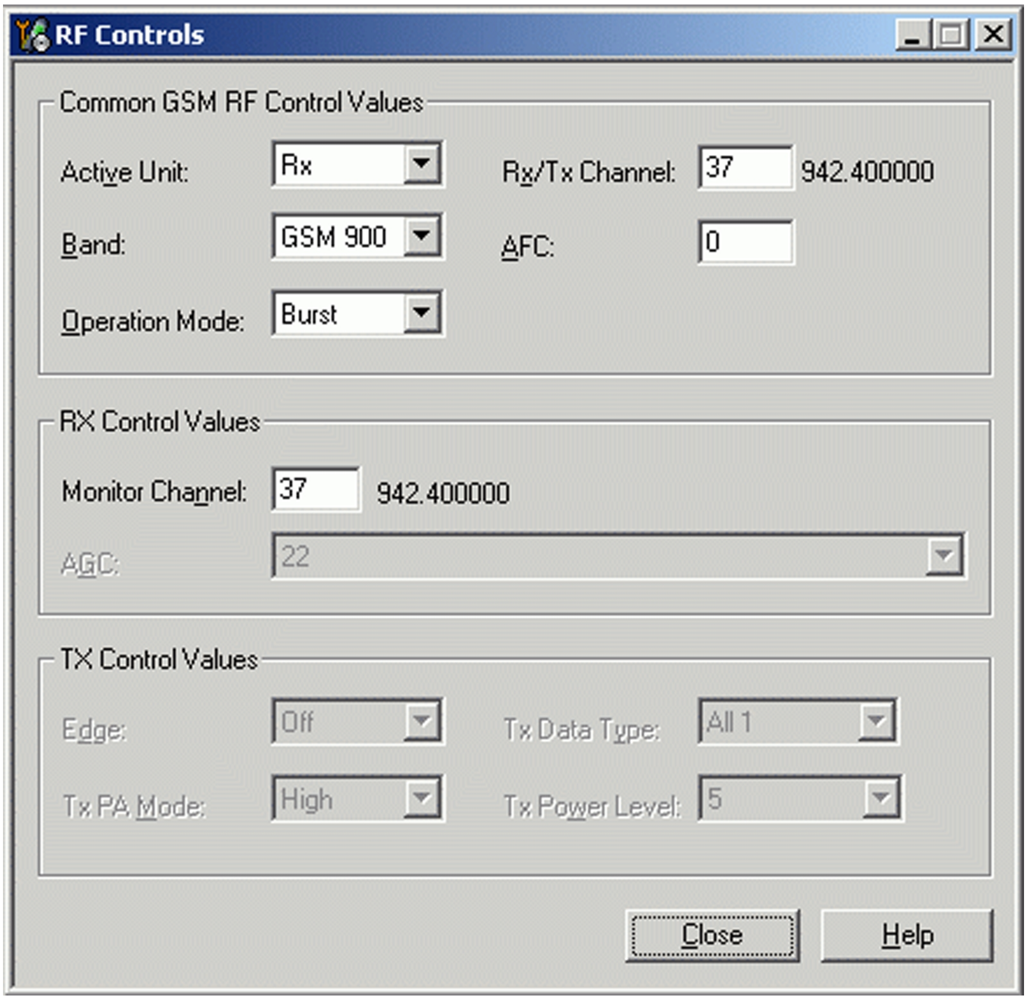
   - ii In the *RF Controls* window:
     - Select band (Default = “GSM850”).
     - Set Active unit to “Rx” (Default).
     - Set Operation mode to “Burst” (Default).
     - Set Rx/Tx channel (see table below).
     - Apply a frequency (see table below) to the RF-connector.

     Note: Remember to compensate for cable attenuation, specific for MJ-82. You will find the values in the Service tools section.

     Apply a signal to the RF-connector (remember to compensate for cable attenuation). See values in the table below.

Band	Channel (RX and TX)	Input frequency (MHz)	Offset (kHz)	Power level (dBm)
GSM850	190	881.66771	67.710	-90

Band	Channel (RX and TX)	Input frequency (MHz)	Offset (kHz)	Power level (dBm)
GSM900	37	942.46771	67.710	-90
GSM1800	700	1842.86771	67.710	-90
GSM1900	661	1960.06771	67.710	-90


RF Controls
Common GSM RF Control Values
RX Control Values
TX Control Values
Close
Help

Active Unit: Rx
Band: GSM 900
Operation Mode: Burst
Rx/Tx Channel: 37 942.400000
AFC: 0
Monitor Channel: 37 942.400000
AGC: 22
Edge: Off
Tx Data Type: All 1
Tx PA Mode: High
Tx Power Level: 5

Figure 45 RF Controls window

Receiver (RX) troubleshooting

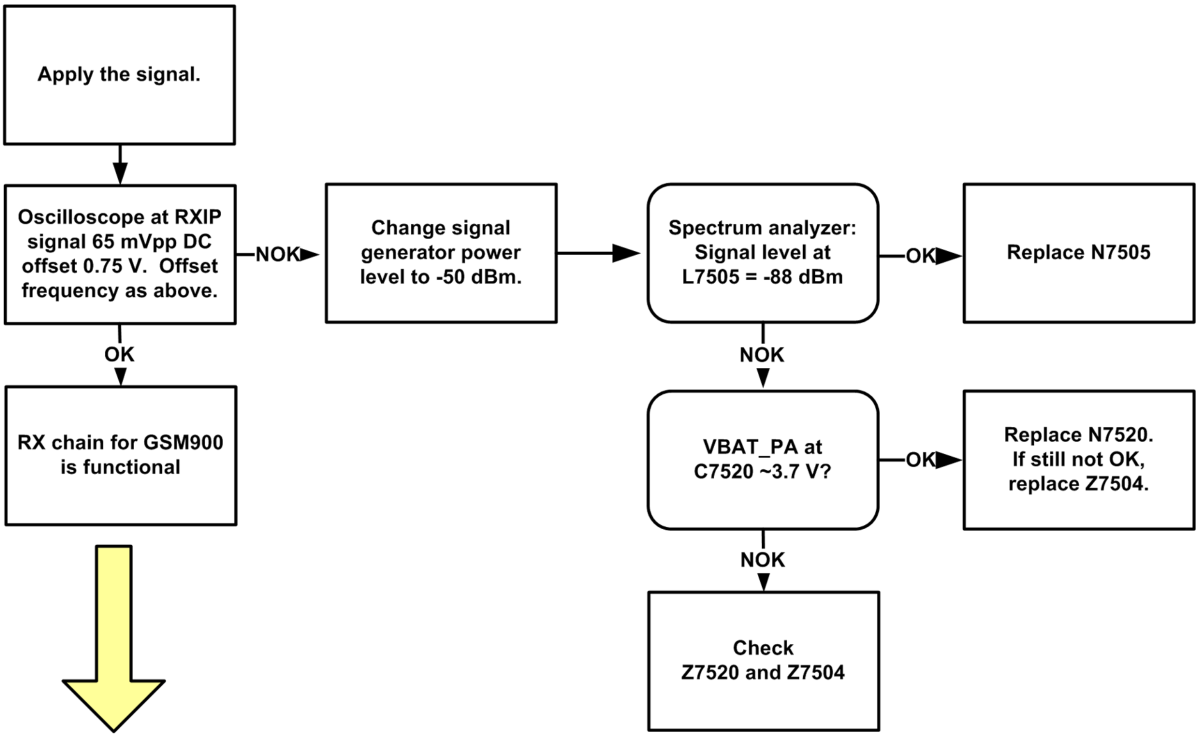
Context

Troubleshoot one band at a time. Start with GSM850 and end with GSM1900.

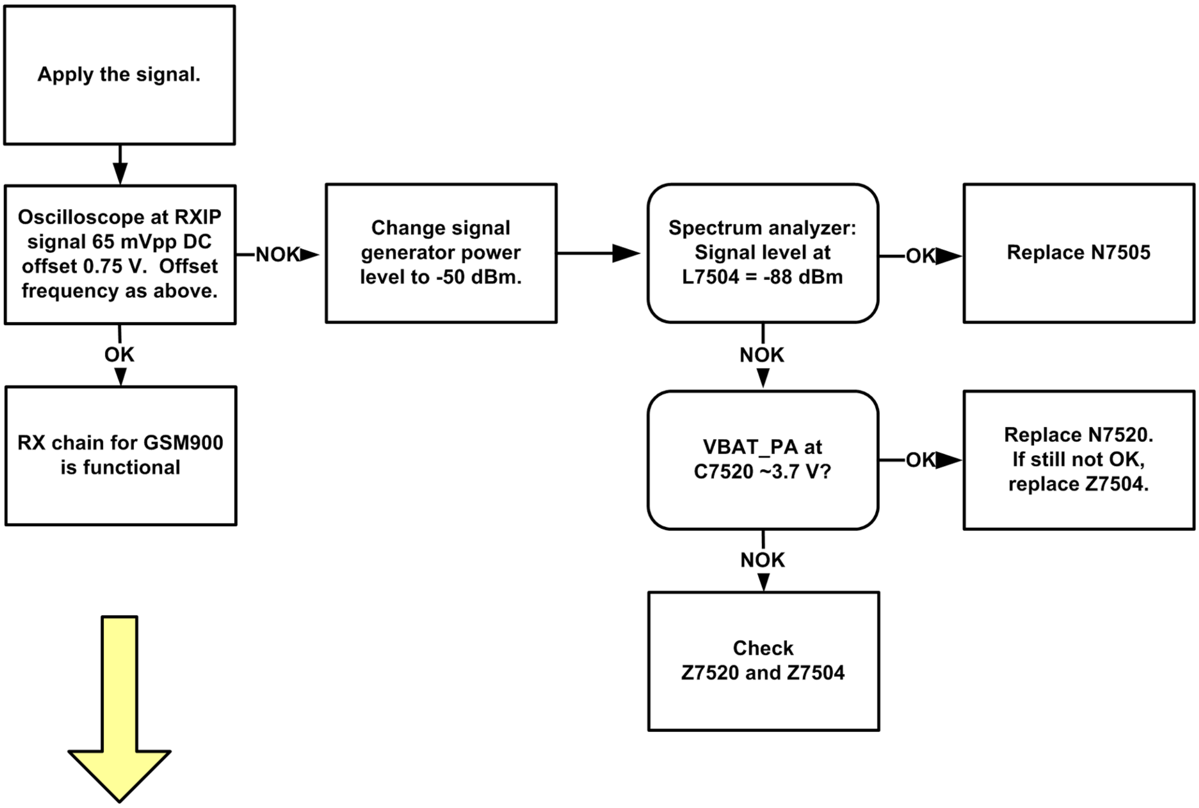
Receiver troubleshooting

Apply a signal according to the table in General instructions for RX troubleshooting (page)

GSM850


Apply the signal.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7505 = -88 dBm
OK
Replace N7505
OK
RX chain for GSM900 is functional
NOK
VBAT_PA at C7520 ~3.7 V?
OK
Replace N7520. If still not OK, replace Z7504.
NOK
Check Z7520 and Z7504

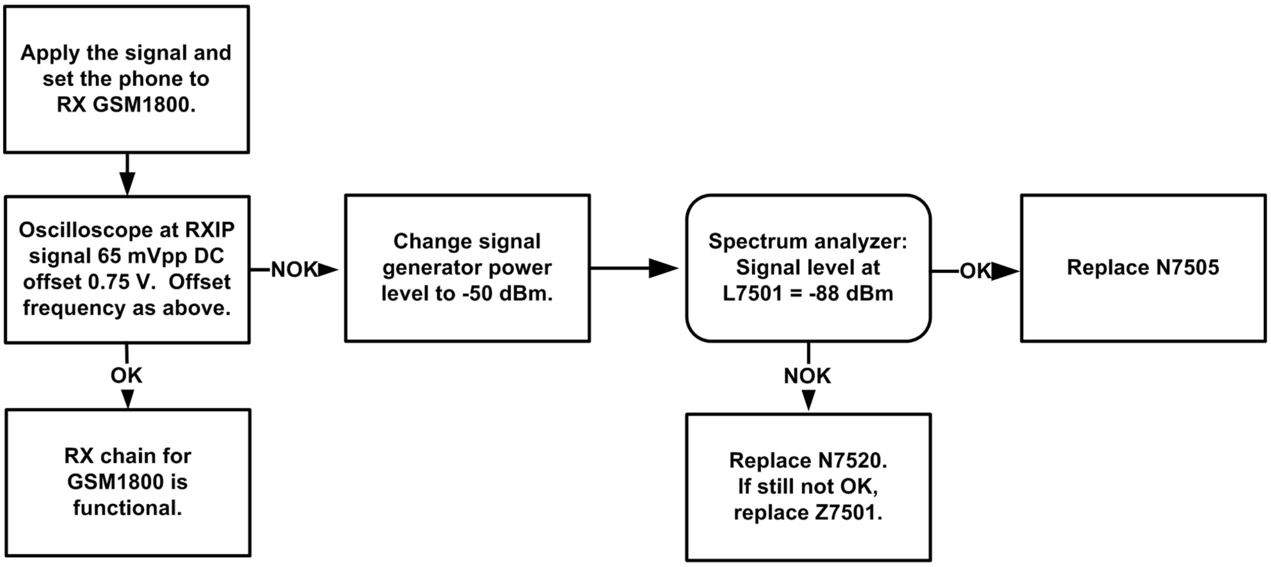
GSM900


Apply the signal.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7504 = -88 dBm
OK
Replace N7505
OK
RX chain for GSM900 is functional
NOK
VBAT_PA at C7520 ~3.7 V?
OK
Replace N7520. If still not OK, replace Z7504.
NOK
Check Z7520 and Z7504

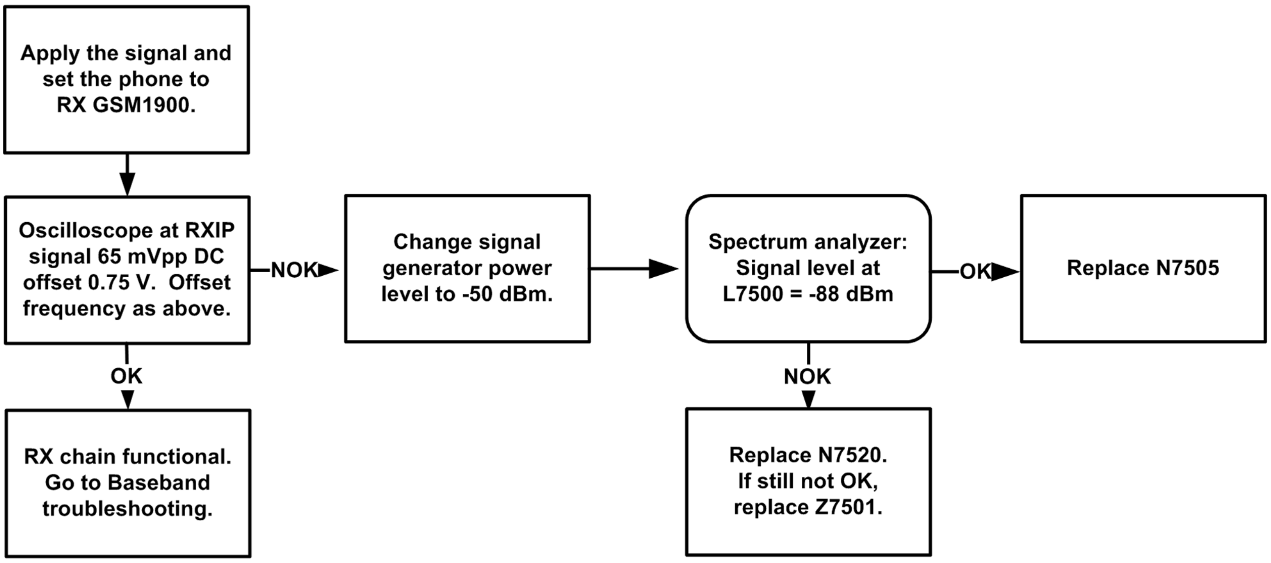
Continue on next page

Continued from previous page

GSM1800


Apply the signal and set the phone to RX GSM1800.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7501 = -88 dBm
OK
Replace N7505
NOK
Replace N7520. If still not OK, replace Z7501.
OK
RX chain for GSM1800 is functional.

GSM1900


Apply the signal and set the phone to RX GSM1900.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7500 = -88 dBm
OK
Replace N7505
NOK
Replace N7520. If still not OK, replace Z7501.
OK
RX chain functional. Go to Baseband troubleshooting.

GSM Rx chain activation for manual measurements / GSM RSSI measurement

Context

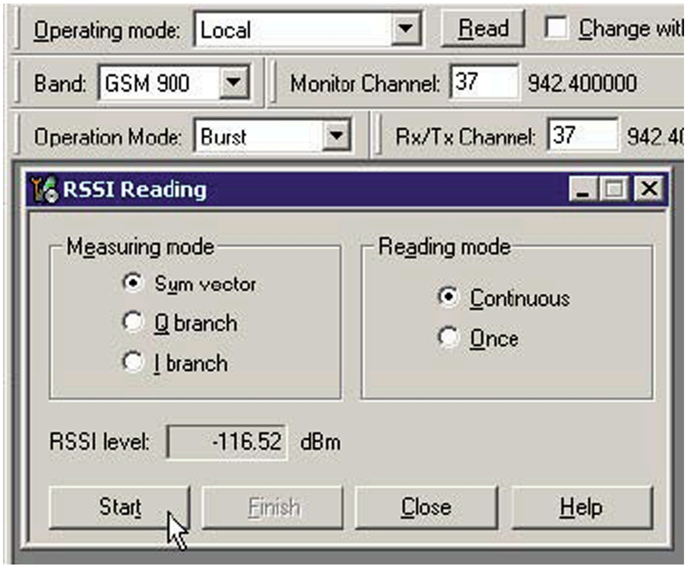
RSSI signal measurement is the main Rx troubleshooting measurement. The test measures the strength of the received signal.

I and Q branches can be measured separately. In GSM, the input signal can be either real GSM signal or a CW (Continuous Wave) signal that is 67.771 kHz above the carrier frequency.

Steps

1. Start *Phoenix* service software.
2. Choose **Testing→GSM→RSSI Reading** .
3. Set the RF signal generator for channel frequency +67.771 kHz CW mode with –80 dBm signal.

   Alternatively set the cellular tester downlink channel to the appropriate channel. Make sure that the tester is set to continuous mode, not to burst mode.
4. In the *RSSI Reading* window, select the appropriate band and channel.



Operating mode: Local
☐ Change wit
Band: GSM 900
Monitor Channel: 37 942.400000
Operation Mode: Burst
Rx/Tx Channel: 37 942.4

RSSI Reading

Measuring mode
● Sum vector
○ Q branch
○ I branch

Reading mode
● Continuous
○ Once

RSSI level: -116.52 dBm

Figure 46 ***RSSI Reading*** **window**

5. To start the measurement, activate GSM Rx chain, click **Start**.

Results

RSSI reading values of the selected band and channel are displayed. The RSSI level must be the same value which is set at the signal generator (-90 dBm).

Transmitter troubleshooting

General instructions for TX troubleshooting

Context

- Tx troubleshooting requires Tx operation.
- Do not transmit on frequencies that are in use!
- Transmitter can be controlled in the local mode for diagnostic purposes.
- The most useful Phoenix tool for GSM transmitter testing is "RF Controls".

- Tx IQ tuning and Tx power tuning can be also used in some cases.
- Remember that retuning is not a fix! Phones are tuned correctly in production.

The first set of steps instructs how to assemble the test setup. This setup is general for all Tx troubleshooting tasks.

Alternative steps provide specific troubleshooting instructions for *Phoenix* service software.

> **Caution:** Never activate the GSM transmitter without a proper antenna load. There should be always 50 Ω load connected to the RF connector (antenna, RF-measurement equipment or at least 2 W dummy load), otherwise the GSM Power amplifier may be damaged.

Steps

1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

   Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-82) and measurement equipment or alternatively use a 50 Ω (at least 2 W) dummy load in the module test jig RF connector, otherwise GSM may be damaged.

   > **Note:** There are two antenna connectors in the module jig:
   > - one for GSM
   > - one for Bluetooth
   >
   > Make sure that all connections are made to the correct RF connector.

   Normally a spectrum analyser is used as measurement equipment.

   > **Note:** The maximum input power of a spectrum analyser is +30 dBm.
   >
   > To prevent any damage, it is recommended to use 10 dB attenuator on the spectrum analyzer input.
4. Set Tx on.

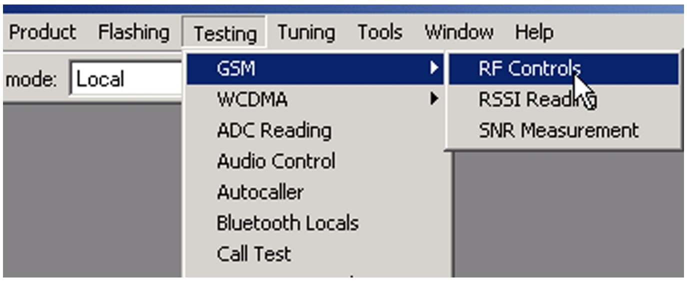
   i Set the phone module to the test jig and start *Phoenix service software*.

   ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10_USB or FPS10_TCP drivers, depending on connection type. When using DAU-9S select FBUS driver).

   iii From the File menu, choose product: **File -> Choose Product -> xx-x*** (* = type designator of the phone)RM-115/126), or press**Ctrl + R** to scan product.

   iv From the toolbar, set operating mode to “Local”.
5. GSM850/900/1800/1900 troubleshooting

   i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls** .

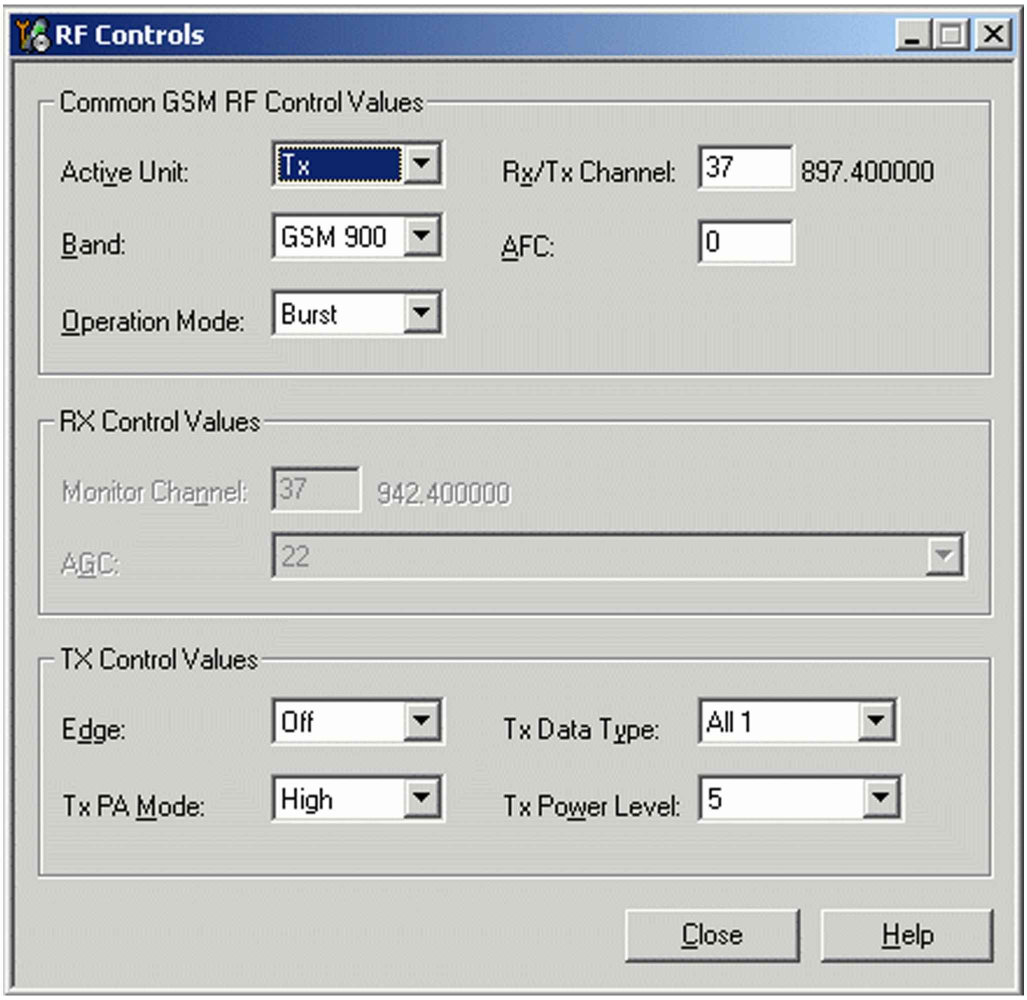


   ii In the *RF Controls* window:

   - Select band "GSM850", “GSM900” or “GSM1800” or “GSM1900” (Default = “GSM850”).
   - Set Active unit to “Tx” (Default = “Rx”).

- Set Operation mode to “Burst” (Default).
- Set Tx data type to “All1” (Default).
- Set Rx/Tx channel (see table below)
- Set Edge to “Off” (Default).
- Set Tx PA mode to “High” (Default).
- Set power level (see table below)

Band	Channel (RX and TX)	TX power level
GSM850	190	5
GSM900	37	5
GSM1800	700	0
GSM1900	661	0


RF Controls

Common GSM RF Control Values
Active Unit: Tx
Rx/Tx Channel: 37 897.400000
Band: GSM 900
AFC: 0
Operation Mode: Burst

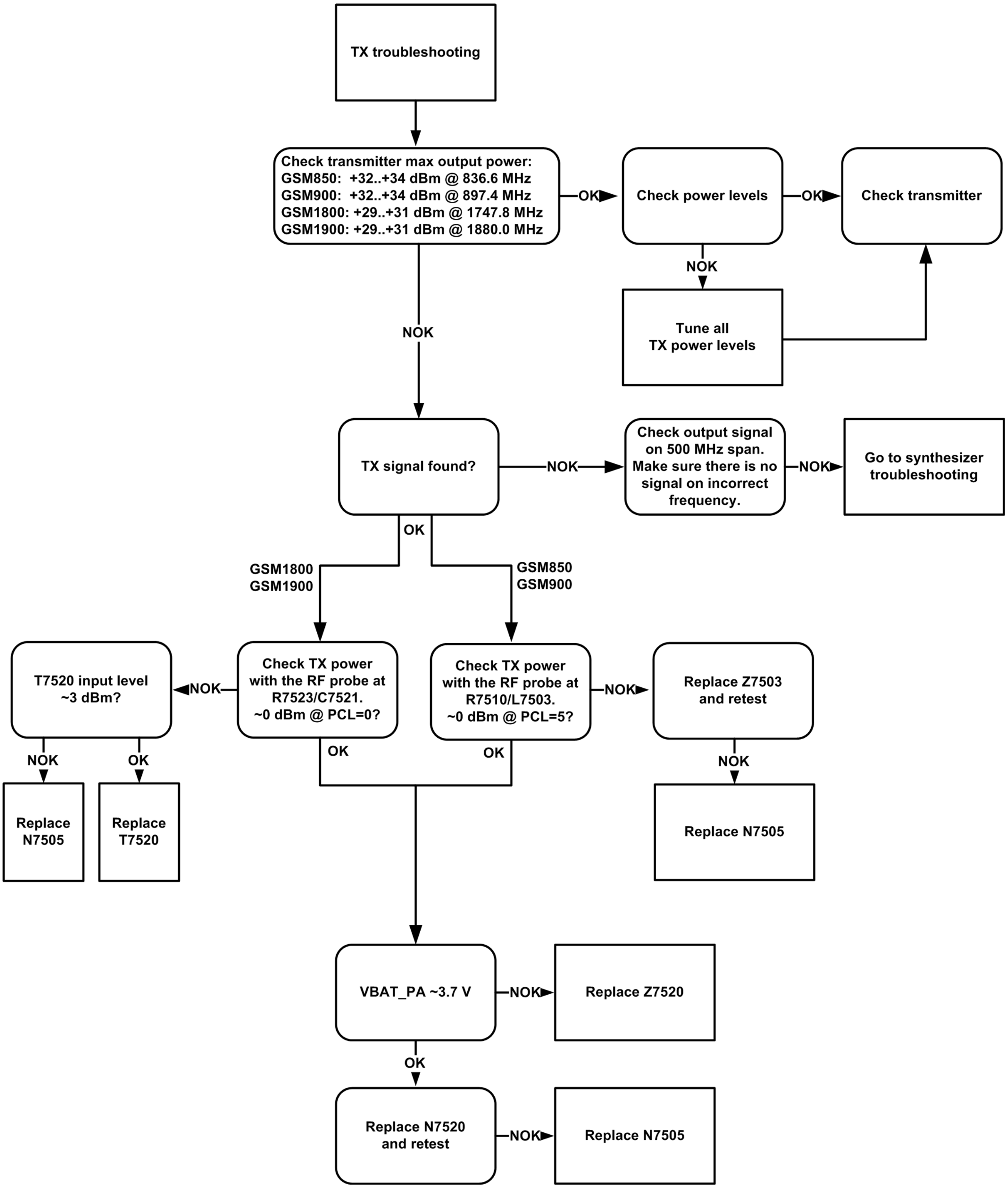
RX Control Values
Monitor Channel: 37 942.400000
AGC: 22

TX Control Values
Edge: Off
Tx Data Type: All 1
Tx PA Mode: High
Tx Power Level: 5

Figure 47 RF Controls window

Transceiver (TX) troubleshooting

Troubleshooting flow


TX troubleshooting
Check transmitter max output power:
GSM850: +32..+34 dBm @ 836.6 MHz
GSM900: +32..+34 dBm @ 897.4 MHz
GSM1800: +29..+31 dBm @ 1747.8 MHz
GSM1900: +29..+31 dBm @ 1880.0 MHz
OK
Check power levels
OK
Check transmitter
NOK
Tune all TX power levels
NOK
TX signal found?
NOK
Check output signal on 500 MHz span. Make sure there is no signal on incorrect frequency.
NOK
Go to synthesizer troubleshooting
OK
GSM1800
GSM1900
GSM850
GSM900
T7520 input level ~3 dBm?
NOK
Check TX power with the RF probe at R7523/C7521. ~0 dBm @ PCL=0?
Check TX power with the RF probe at R7510/L7503. ~0 dBm @ PCL=5?
NOK
Replace Z7503 and retest
NOK
OK
NOK
OK
OK
Replace N7505
Replace T7520
Replace N7505
VBAT_PA ~3.7 V
NOK
Replace Z7520
OK
Replace N7520 and retest
NOK
Replace N7505

Checking antenna functionality

In the antenna, there is one Feed and two GND contacts.

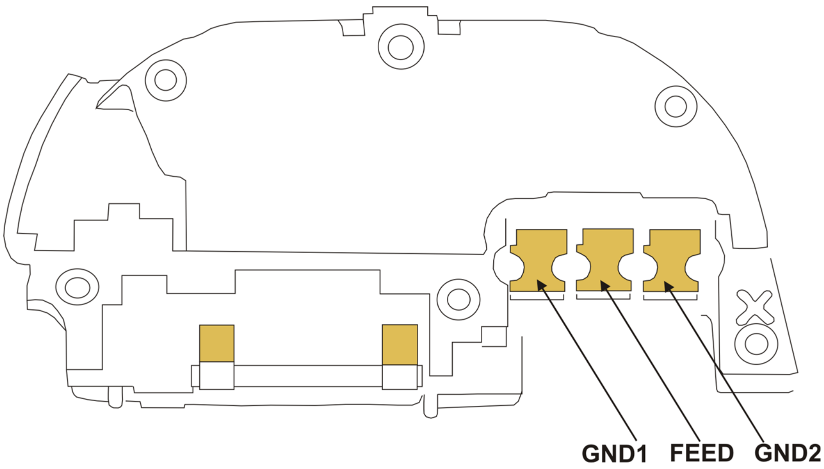


Figure 48 Antenna module

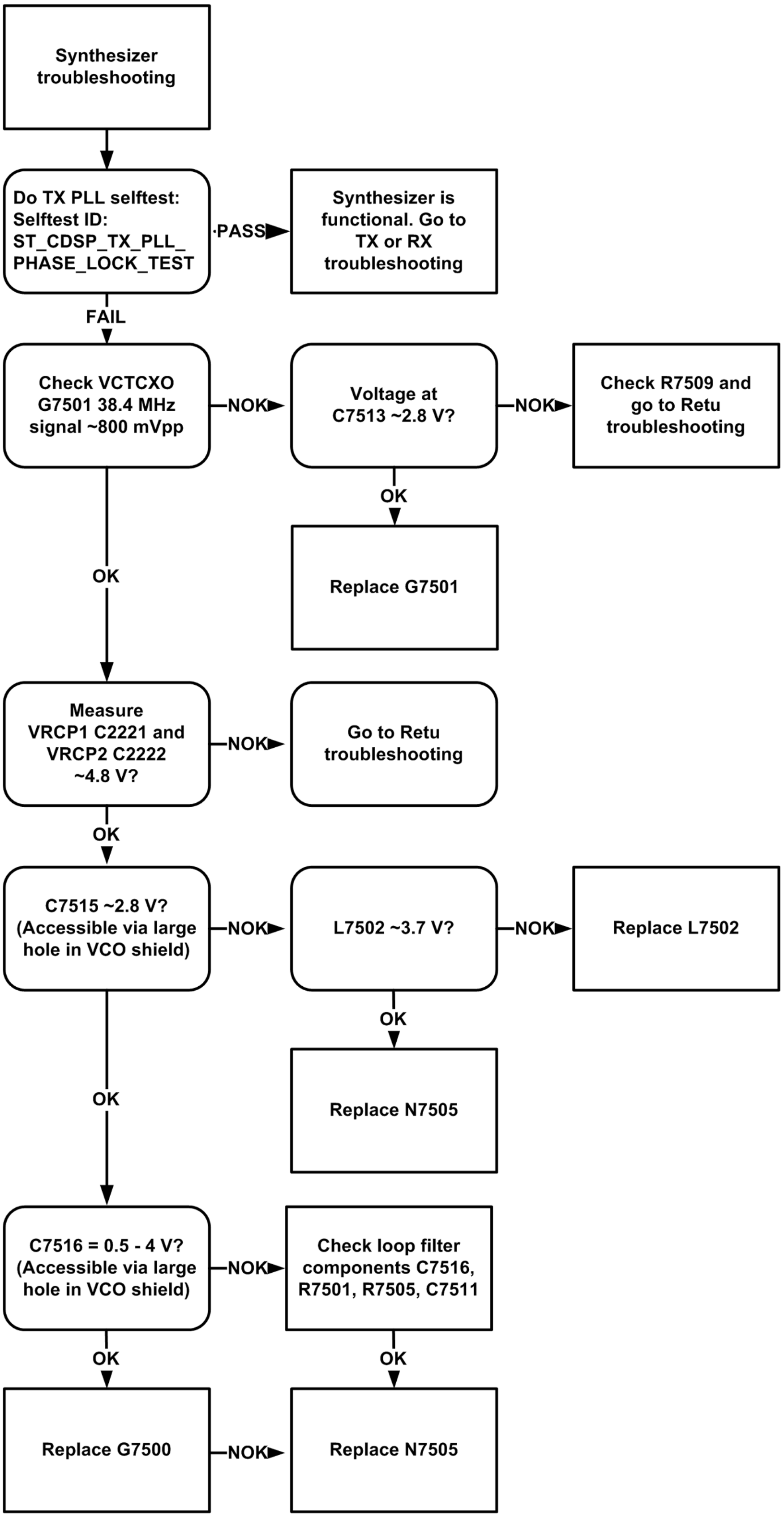
Between GND1 and Feed, a DC short-circuit can be measured.

GND2 has no DC connection to the other contacts.

The antenna is functioning normally when the contacts function (Feed-GND1 = ~0.2 Ω) Also check visually to make sure that the antenna is intact.

Synthesizer troubleshooting

Synthesizer troubleshooting


Synthesizer troubleshooting
Do TX PLL selftest: Selftest ID: ST_CDSP_TX_PLL_ PHASE_LOCK_TEST
PASS
Synthesizer is functional. Go to TX or RX troubleshooting
FAIL
Check VCTCXO G7501 38.4 MHz signal ~800 mVpp
NOK
Voltage at C7513 ~2.8 V?
NOK
Check R7509 and go to Retu troubleshooting
OK
Replace G7501
OK
Measure VRCP1 C2221 and VRCP2 C2222 ~4.8 V?
NOK
Go to Retu troubleshooting
OK
C7515 ~2.8 V? (Accessible via large hole in VCO shield)
NOK
L7502 ~3.7 V?
NOK
Replace L7502
OK
Replace N7505
OK
C7516 = 0.5 - 4 V? (Accessible via large hole in VCO shield)
NOK
Check loop filter components C7516, R7501, R7505, C7511
OK
OK
Replace G7500
NOK
Replace N7505

RF tunings

Introduction to RF tunings

Important: Only perform RF tunings if:

- one or more of the RF components have been replaced
- flash memory chip is replaced or corrupted.

RF calibration is always performed with the help of a product-specific module jig (MJ-82), never with an RF coupler. Using an RF coupler in the calibration phase will cause a complete mistuning of the RF part.

Important: After RF component replacements, **always** use autotuning. Manual tunings are only required in rare cases.

Cable and adapter losses

RF cables and adapters have some losses. They have to be taken into account when the phone is tuned. As all RF losses are frequency dependent, the user has to act very carefully and understand the measurement setup.

For RF attenuations of the module jig, please refer to the Service tools section.

Auto tuning for BB5.0

This phone can be tuned automatically.

Autotune is designed to align the phone's RF part easier and faster. It performs calibrations, tunings and measurements of RX and TX. The results are displayed and logged in a result file, if initiated.

Hardware set up

Hardware requirements for auto tuning:

- PC (Windows 2000/XP) with GPIB card
- Power supply
- Product specific module jig
- Cables: XRF-1 (RF cable), USB cable, GBIP cable and DAU-9S
- Signal analyser (TX), signal generator (RX) and RF-splitter *or* one device including all.

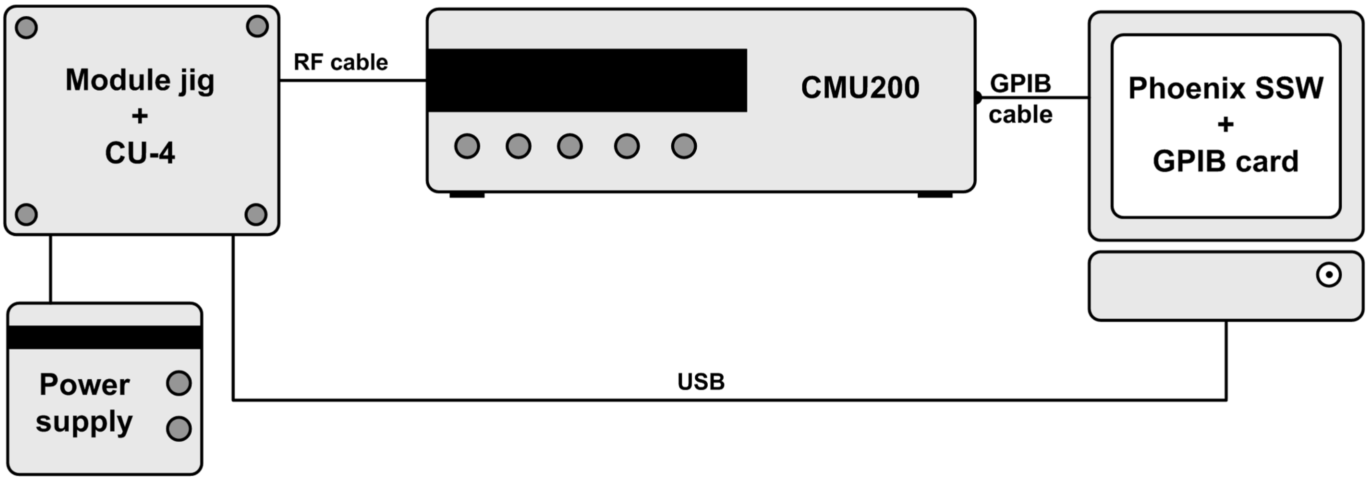


Figure 49 Auto tuning concept with CMU200

Phoenix preparations

Install the phone specific data package, for example *RM-115/126_dp_1.78_sw_sh3.26.exe*. This defines phone specific settings..

Auto tuning procedure

1 Make sure the phone (in the jig) is connected to the equipment. Else, some menus will not be shown in Phoenix.

2 To go to autotune, select *Tuning (Alt-U)* > *Auto-Tune (Alt-A)* from the menu.

3 Start autotuning, clicking the *Tune* button.

System mode independent manual tunings

RF channel filter calibration

Context

Rf channel filter calibration tunes the internal low pass filters of the RF ASIC, that limit the bandwidth of BB IQ signals.

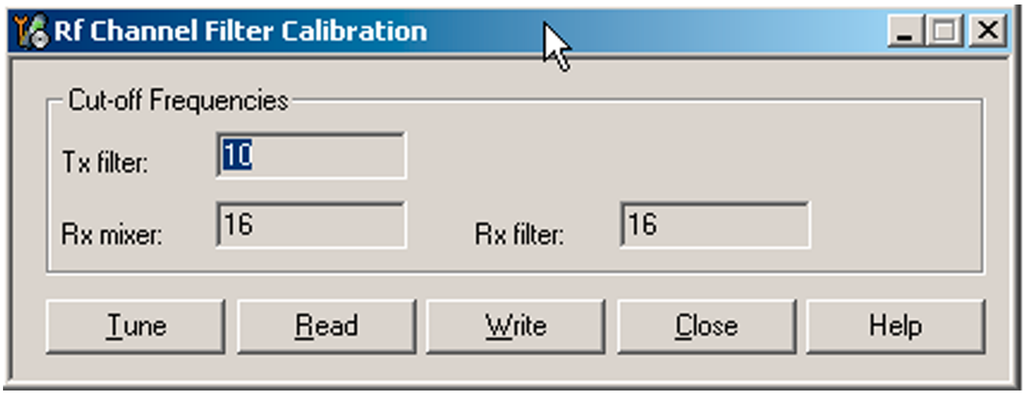
Table 13 Rf channel filter calibration tuning limits

	Min	Typ	Max
Tx filter	0	10	31
RX mixer	0	13	31
Rx filter	0	16	31

Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning→Rf Channel Filter Calibration** .
3. Click **Tune**.
4. To save the values to the PMM (Phone Permanent Memory) area, click **Write**.
5. To close the *Rf Channel Filter Calibration* window, click **Close**.

Results



Tx filter: 10

Rx mixer: 16

Rx filter: 16

Figure 50 Rf channel filter calibration typical values

PA (power amplifier) detection

Context

The PA detection procedure detects which PA manufacturer is used for phone PAs.

If a PA is changed or if the permanent memory (PMM) data is corrupted, PA detection has to be performed before Tx tunings.

Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning→PA Detection** .
3. Click **Tune**.
4. Check that the detected PA manufacturers are corresponding to the actual chips on the board.
5. To end the procedure, click **Close**.

■ GSM receiver tunings

Rx calibration (GSM)

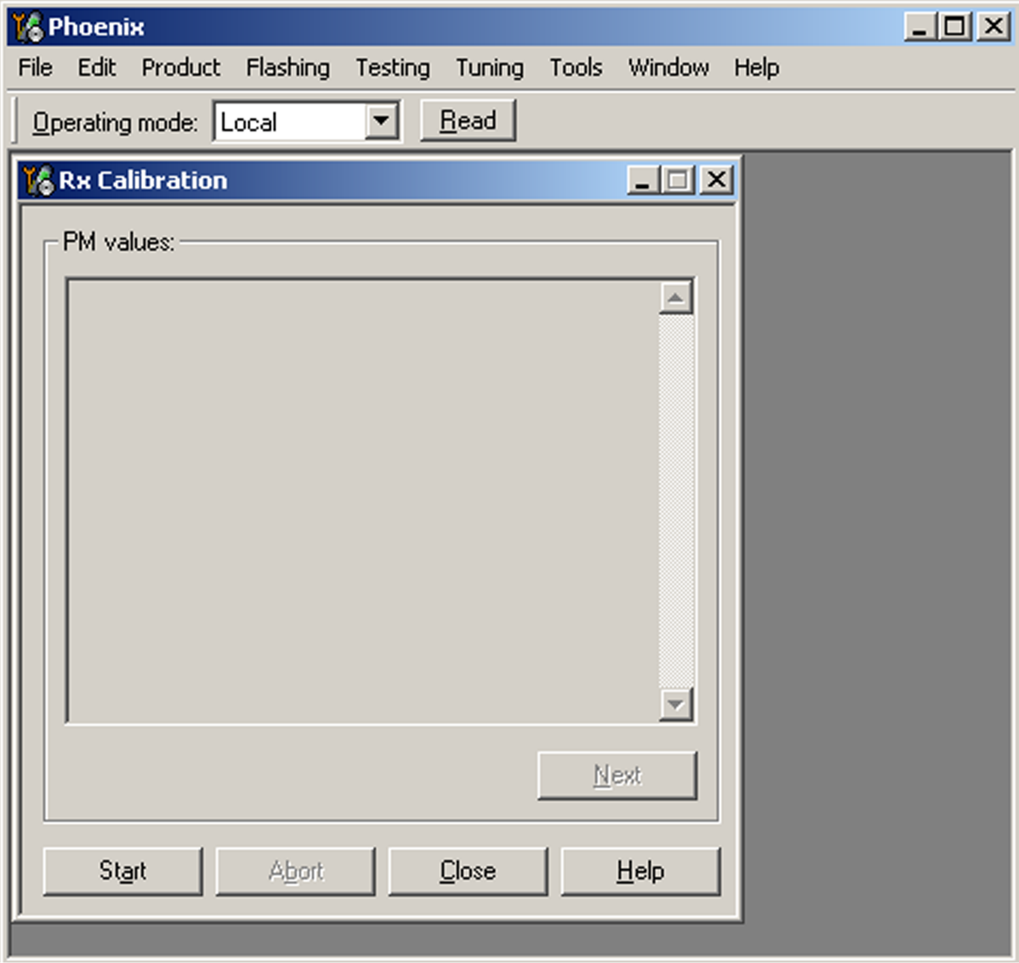
Context

Rx Calibration is used to find out the real gain values of the GSM Rx AGC system and tuning response of the AFC system (AFC D/A init value and AFC slope)

Steps

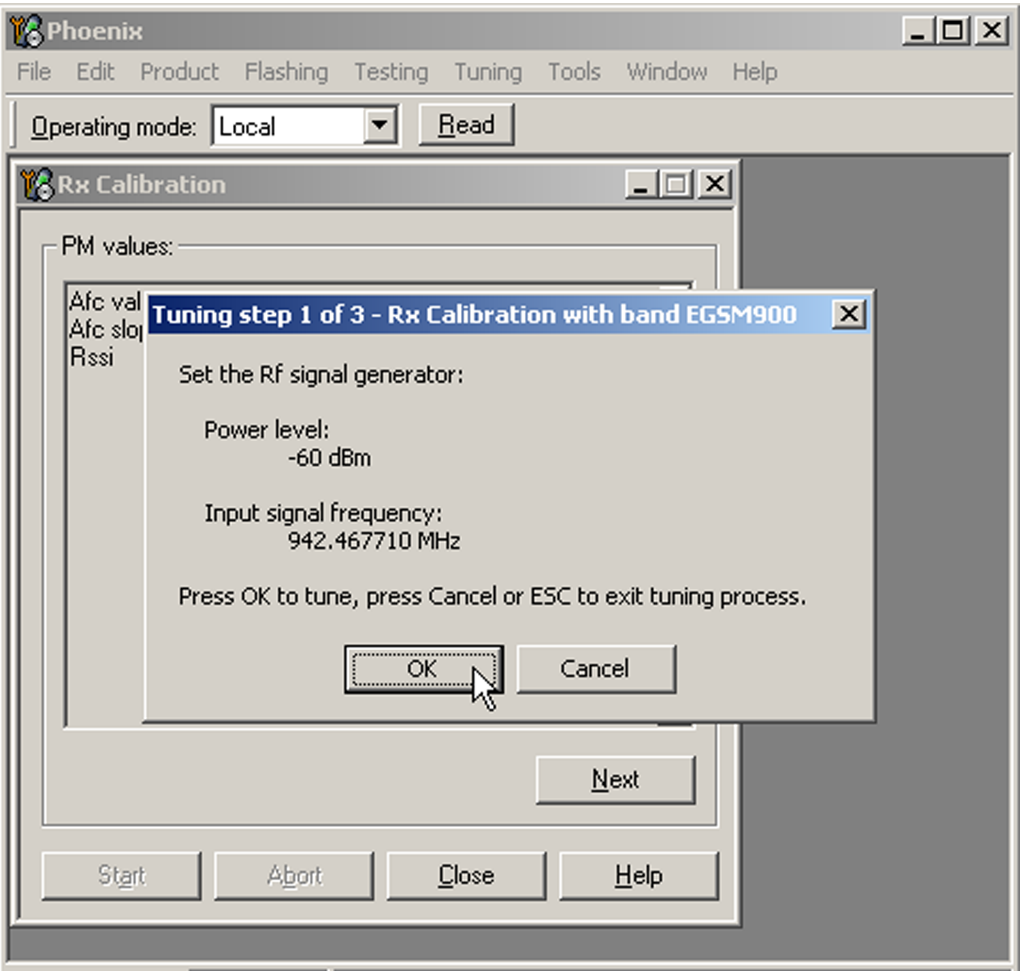
1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning→GSM→Rx Calibration** .

5. Click **Start**.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Calibration
PM values:
Next
Start
Abort
Close
Help

6. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the **Rx Calibration with band EGSM900** (step 1-3) pop-up window.

    Important: The calibration uses a non-modulated CW signal. Increase the signal generator level by cable attenuation and module jig probe attenuation.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Calibration
PM values:
Afc val
Afc slo
Rssi
Tuning step 1 of 3 - Rx Calibration with band EGSM900
OK
Cancel
Next
Start
Abort
Close
Help

Set the Rf signal generator:

Power level:
-60 dBm

Input signal frequency:
942.467710 MHz

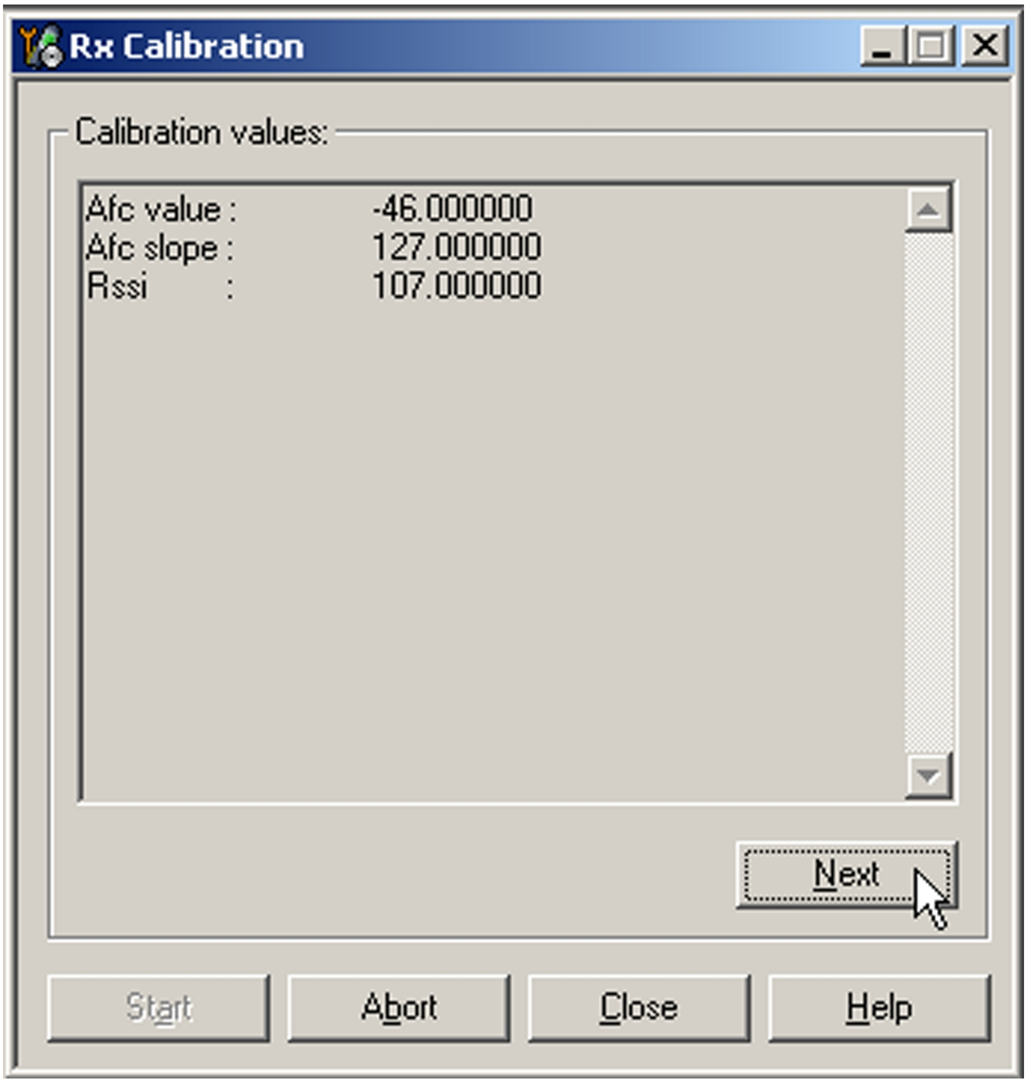
Press OK to tune, press Cancel or ESC to exit tuning process.

7. To perform the tuning, click **OK**.
8. Check that the tuning values are within the limits specified in the following table:

Table 14 RF tuning limits in Rx calibration

	Min	Typ	Max	Unit
GSM850				
AFC Value (init)	-200	-80..40	200	dB
AFC slope	0	108..121	200	dB
RSSI (AGC-0)	106	107..110	114	dB
GSM900				
AFC Value (init)	-200	-105..62	200	dB
AFC slope	0	122	200	dB
RSSI (AGC-0)	106	107...110	114	dB
GSM1800				
RSSI (AGC-0)	105	105...109	114	dB
GSM1900				
RSSI (AGC-0)	105	105...109	114	dB

9. Click **Next** to continue with GSM1800 Rx tuning.



Rx Calibration

Calibration values:

Afc value : -46.000000
Afc slope : 127.000000
Rssi : 107.000000

Next action

Repeat steps 6 to 9for GSM1800 and GSM1900

Rx band filter response compensation (GSM)

Before you begin

Rx calibration must be performed before the Rx band filter response compensation.

Context

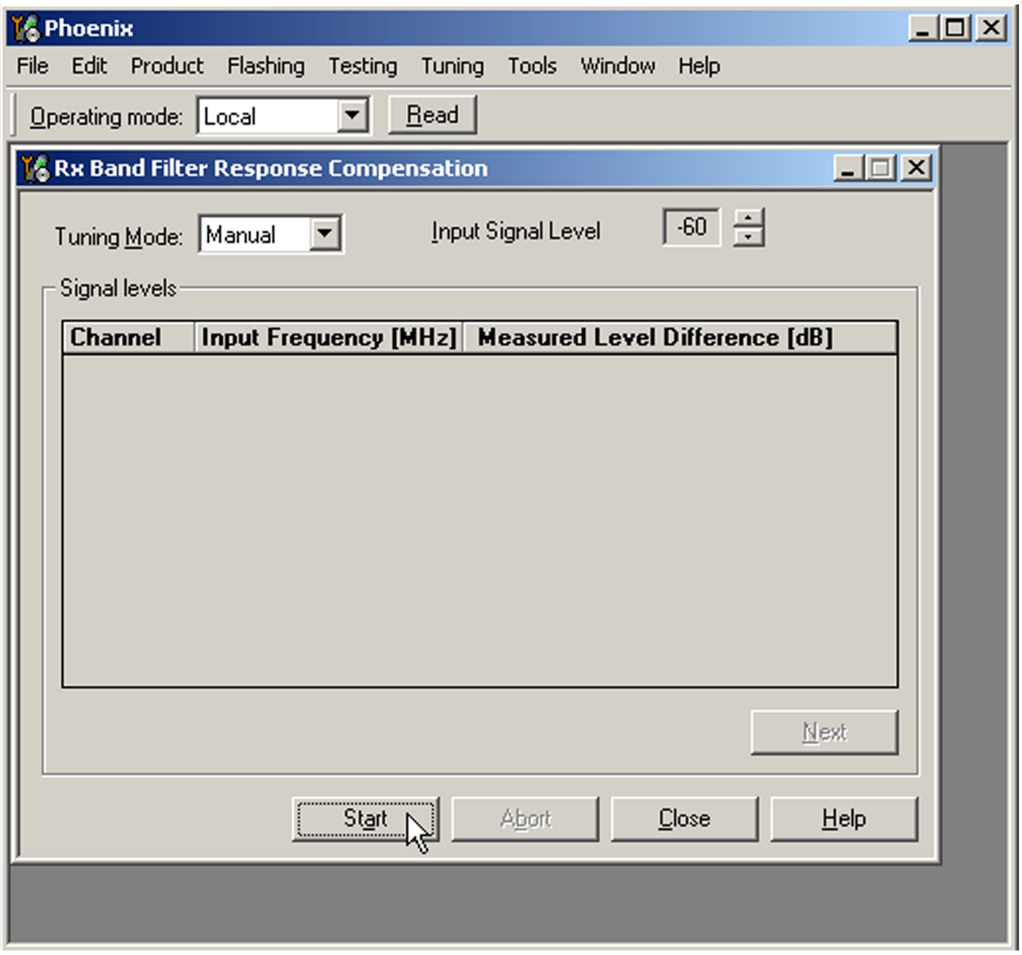
On each GSM Rx band, there is a band filter in front of the RF ASIC front end. The amplitude ripple caused by these filters causes ripple to the RSSI measurement, and therefore calibration is needed.

The calibration has to be repeated for each GSM band.

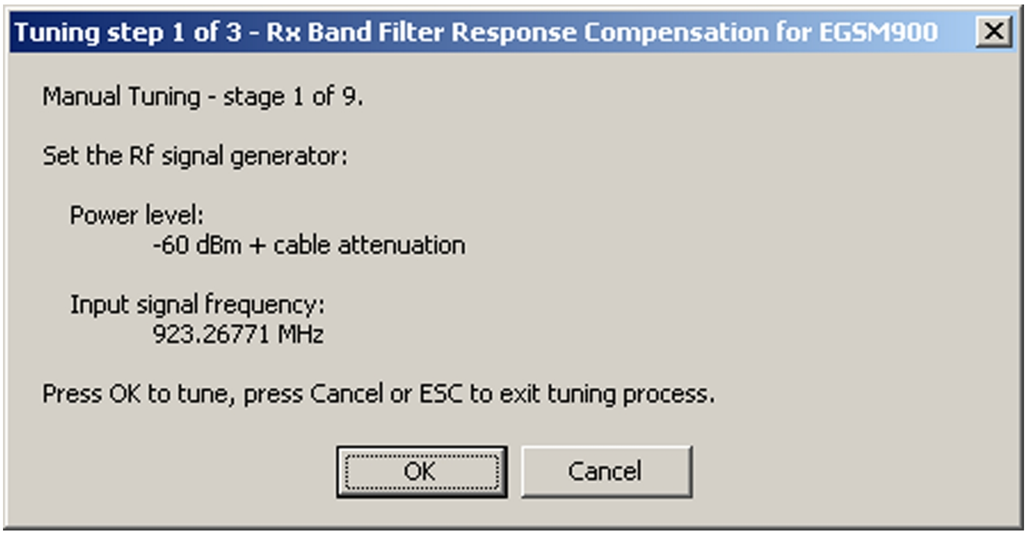
Steps

1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.

4. Select **GSM900** band.
5. Choose **Tuning→GSM→Rx Band Filter Response Compensation** .
6. Select **Tuning mode: manual**
7. Click **Start**.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Band Filter Response Compensation
Tuning Mode: Manual
Input Signal Level -60
Signal levels
Channel | Input Frequency [MHz] | Measured Level Difference [dB]
Next
Start
Abort
Close
Help

8. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the *Rx Band Filter Response Compensation for EGSM900* pop-up window, step 1-3.


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900

Manual Tuning - stage 1 of 9.

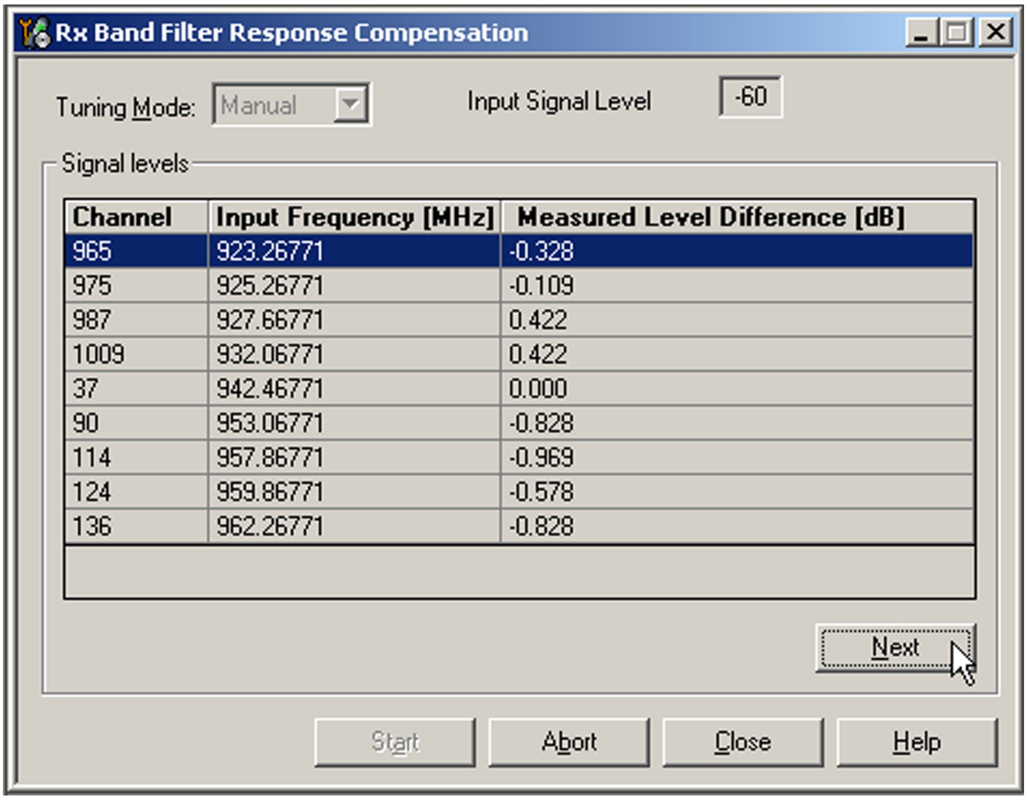
Set the Rf signal generator:

Power level:
-60 dBm + cable attenuation

Input signal frequency:
923.26771 MHz

Press OK to tune, press Cancel or ESC to exit tuning process.

9. To perform tuning, click **OK**.
10. Go through all 9 frequencies. The following table will be shown:



Tuning Mode: Manual

Input Signal Level: -60

Signal levels

Channel	Input Frequency [MHz]	Measured Level Difference [dB]
965	923.26771	-0.328
975	925.26771	-0.109
987	927.66771	0.422
1009	932.06771	0.422
37	942.46771	0.000
90	953.06771	-0.828
114	957.86771	-0.969
124	959.86771	-0.578
136	962.26771	-0.828

11. Check that the tuning values are within the limits specified in the following table:

	Min	Typ	Max	Unit
GSM850				
Ch. 118/867.26771 MHz	-6	-1	2	dB
Ch. 128/869.26771 MHz	-3	0	2	dB
Ch. 140/871.66771 MHz	-3	0	2	dB
Ch. 172/878.06771 MHz	-2	0	2	dB
Ch. 190/881.66771 MHz	-2	0	2	dB
Ch. 217 / 887.06771 MHz	-2	0	2	dB
Ch. 241/891.86771 MHz	-3	0	2	dB
Ch. 251/893.86771 MHz	-3	0	2	dB
Ch. 261/895.86771 MHz	-6	-1	-2	dB
GSM900				
Ch. 965 / 923.26771 MHz	-6	-1	2	dB
Ch. 975 / 925.26771 MHz	-3	0	2	dB
Ch. 987 / 927.66771 MHz	-3	0	2	dB
Ch. 1009 / 932.06771 MHz	-2	0	2	dB

	Min	Typ	Max	Unit
Ch. 37 / 942.46771 MHz	-2	0	2	dB
Ch. 90 / 953.06771 MHz	-2	0	2	dB
Ch. 114 / 957.86771 MHz	-3	0	2	dB
Ch. 124 / 959.86771 MHz	-3	0	2	dB
Ch. 136 / 962.26771 MHz	-6	-1	2	dB
GSM1800				
Ch. 497 / 1802.26771 MHz	-6	-1	3	dB
Ch. 512 / 1805.26771 MHz	-3	0	3	dB
Ch. 535 / 1809.86771 MHz	-3	0	3	dB
Ch. 606 / 1824.06771 MHz	-3	0	3	dB
Ch. 700 / 1842.86771 MHz	-3	0	3	dB
Ch. 791 / 1861.06771 MHz	-3	0	3	dB
Ch. 870 / 1876.86771 MHz	-3	0	3	dB
Ch. 885 / 1879.86771 MHz	-3	0	3	dB
Ch. 908 / 1884.46771 MHz	-6	-1	3	dB
GSM1900				
Ch. 496 / 1927.06771 MHz	-6	-1	2	dB
Ch. 512 / 1930.26771 MHz	-3	0	2	dB
Ch. 537 / 1935.26771 MHz	-3	0	2	dB
Ch. 586 / 1945.06771 MHz	-3	0	2	dB
Ch. 661 / 1960.06771 MHz	-3	0	2	dB
Ch. 736 / 1975.06771 MHz	-3	0	2	dB
Ch. 794 / 1986.66771 MHz	-3	0	2	dB
Ch. 810 / 1989.86771 MHz	-3	0	2	dB
Ch. 835 / 1994.86771 MHz	-6	-1	2	dB

12. If the values are within the limits, click **Next** to continue to the next band.

Next action

Repeat the steps 8 to 12 for GSM1800 and GSM1900.

GSM transmitter tunings

Tx IQ tuning (GSM)

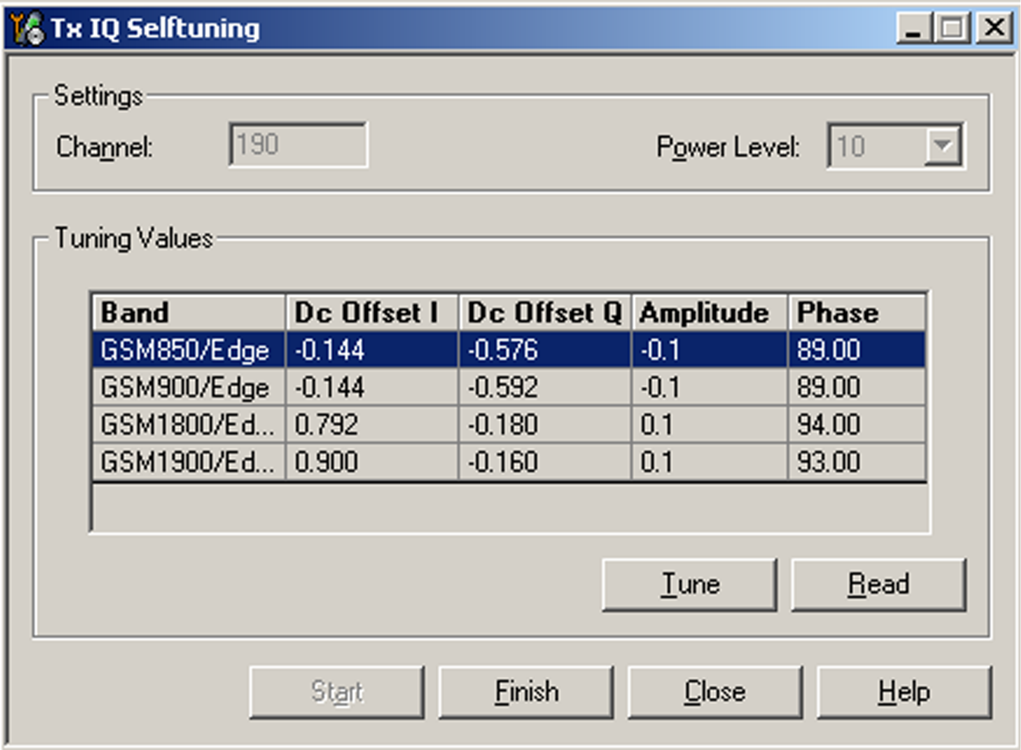
Context

The Tx path branches to I and Q signals at RF I/Q modulator. Modulator and analog hardware located after it cause unequal amplitude and phase disturbance to I and Q signal paths. Tx IQ tuning balances the I and Q branches.

Tx IQ tuning must be performed for all GSM bands.

Steps

1. Start *Phoenix* service software.
2. From the **Operating mode** drop-down menu, set mode to **Local**.
3. Choose **Tuning→GSM→Tx IQ Tuning** .
4. Select **Mode: Automatic**.



Tx IQ Selftuning

Settings

Channel: 190

Power Level: 10

Tuning Values

Band	Dc Offset I	Dc Offset Q	Amplitude	Phase
GSM850/Edge	-0.144	-0.576	-0.1	89.00
GSM900/Edge	-0.144	-0.592	-0.1	89.00
GSM1800/Ed...	0.792	-0.180	0.1	94.00
GSM1900/Ed...	0.900	-0.160	0.1	93.00

5. Select **Band: GSM900** and click **Start**.
6. Click **Next** to start GSM1800 band TX IQ tuning.
7. Click **Next** to start GSM1900 band TX IQ tuning.
8. Click**Finish** and then **Close**.

Next action

Tuning sliders should be close to the center of the scale after the tuning and within the limits specified in the following table. If they are not within the limits, check Tx IQ quality manually.

	Min	Typ	Max	Unit
GSM850				
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
GSM900				

	Min	Typ	Max	Unit
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
GSM1800/GSM1900				
I/Q DC	-6	0.5	6	%
Ampl	-1	0	1	dB
Phase	95	100	110	°

Tx power level tuning (GSM)

Context

Because of variations at the IC (Integrated Circuit) process and discrete component values, the actual transmitter RF gain of each phone is different. Tx power level tuning is used to find out mapping factors called 'power coefficients’. These adjust the GSM transmitter output power to fulfill the specifications.

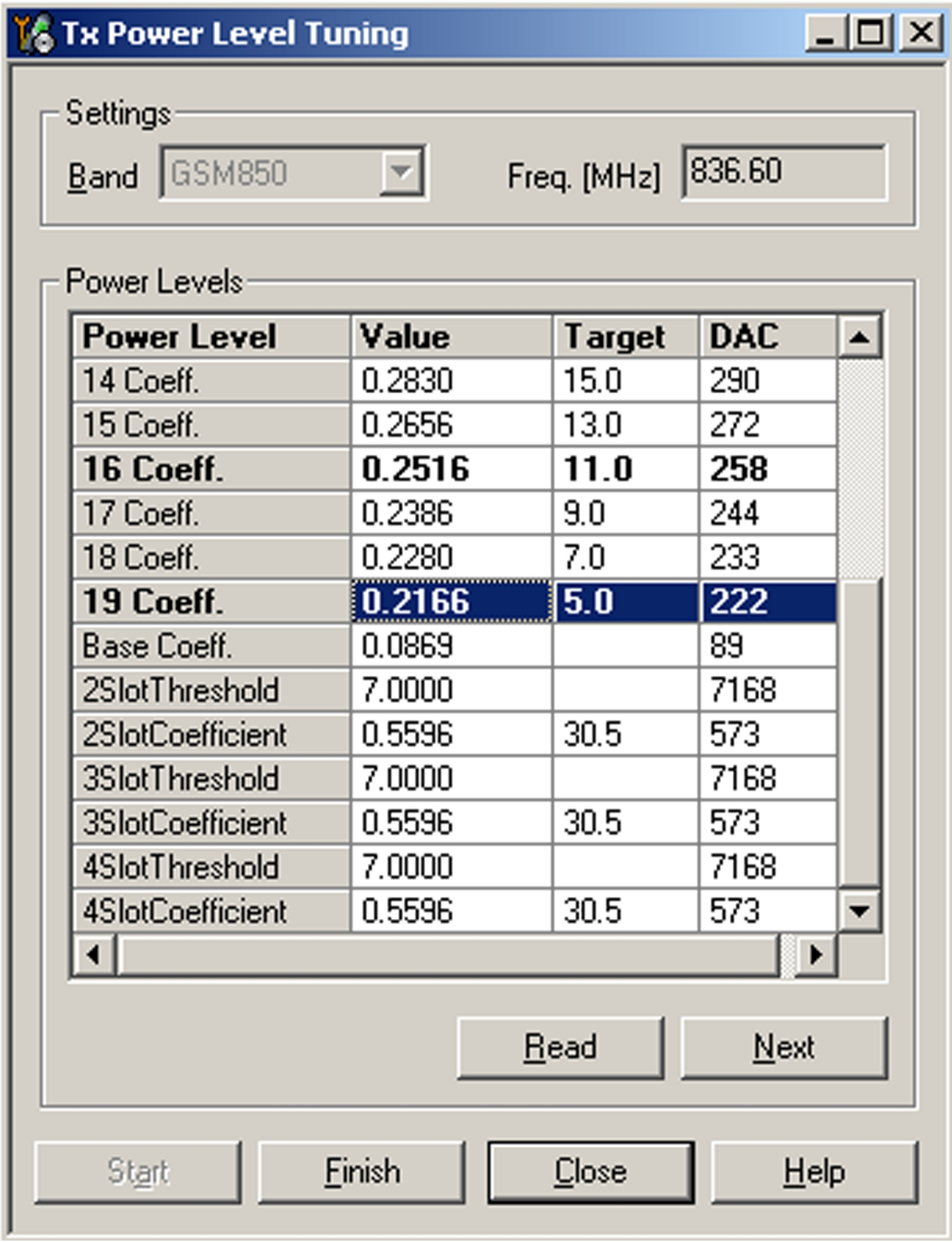
For EDGE transmission, the bias settings of the GSM PA are adjusted in order to improve linearity. This affects the PA gain and hence the power levels have to be aligned separately for EDGE transmission.

Tx power level tuning has to be performed on all GSM bands.

Steps

1. Connect the phone to a spectrum analyzer.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning→GSM→Tx Power Level Tuning** .

5. Click **Start**.l



Band: GSM850

Freq. [MHz]: 836.60

Power Level	Value	Target	DAC
14 Coeff.	0.2830	15.0	290
15 Coeff.	0.2656	13.0	272
16 Coeff.	**0.2516**	**11.0**	**258**
17 Coeff.	0.2386	9.0	244
18 Coeff.	0.2280	7.0	233
19 Coeff.	**0.2166**	**5.0**	**222**
Base Coeff.	0.0869		89
2SlotThreshold	7.0000		7168
2SlotCoefficient	0.5596	30.5	573
3SlotThreshold	7.0000		7168
3SlotCoefficient	0.5596	30.5	573
4SlotThreshold	7.0000		7168
4SlotCoefficient	0.5596	30.5	573

6. Set the spectrum analyzer for power level tuning:

Frequency	Channel frequency: • **836.6 MHz GSM850** • **897.4MHz GSM900** • **1747.8MHz GSM1800** • **1880MHz GSM1900**
Span	0 Hz
Sweep time	2ms
Trigger	Video triggering (-10dBm)
Resolution BW	3MHz

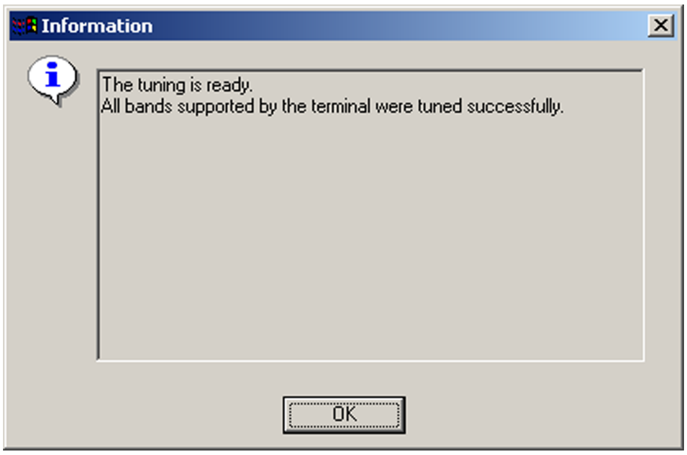
Video BW	3MHz
Reference level offset	sum cable attenuation with module jig attenuation
Reference level	33dBm

A power meter with a peak power detector can be also used. Remember to take the attenuations into account.

7. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing **+** or **–** keys.
8. If all bold power levels are adjusted, click **Next** to continue with **GSM850 EDGE**.
9. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing **+** or **–** keys.

Next action

Continue tuning the bold power levels of the GSM900, GSM1800 and GSM1900 bands. You will see this message, if finished successfully:



The tuning is ready.
All bands supported by the terminal were tuned successfully.

(This page left intentionally blank.)

8 — System module

(This page left intentionally blank.)

Table of Contents

Phone description........8–5
Engine........8–8
  Engine modules........8–8
  RF engine........8–9
  Main processor........8–9
  Energy management........8–9
Battery and charging........8–10
Test interface........8–11
Interfaces........8–11
  PopPort system connector........8–11
  FM radio........8–12
  Camera........8–12
  SIM........8–13
  µSD card interface........8–13
User interface........8–14
  User interface........8–14
  Fold switch........8–15
Audio concept........8–16
  Audio hardware architecture........8–16
  Internal microphone........8–17
  External microphone........8–17
  Internal earpiece........8–17
  Internal speaker (IHF)........8–17
  External earpiece........8–17
  Vibra circuitry........8–17
Connections........8–18
  USB interface........8–18
  Bluetooth........8–18
  IrDA........8–19
Technical specifications........8–19
  General specifications........8–19
  Battery endurance........8–19
  Environmental conditions........8–20
  Electrical characteristics........8–20
  Main RF characteristics........8–21

List of Tables

Table 15 PopPort connector pins and signals........8–12
Table 16 Key signal matrix........8–15
Table 17 Normal and extreme voltages........8–20
Table 18 Channel numbers and frequencies........8–21
Table 19 Main RF characteristics........8–21
Table 20 Transmitter characteristics........8–22
Table 21 Receiver characteristics........8–22

List of Figures

Figure 51 PWB overview........8–6
Figure 52 System block diagram........8–7

Figure 53 Board and module connections........8–8
Figure 54 Battery BL-4C........8–10
Figure 55 Old (left) and new (right) charger plugs........8–11
Figure 56 Test interface........8–11
Figure 57 PopPort connector pins........8–11
Figure 58 FM radio interface........8–12
Figure 59 Camera interface........8–12
Figure 60 RAPGSM/Retu SIM interface connections........8–13
Figure 61 User interface block diagram........8–14
Figure 62 Keyboard layout........8–15
Figure 63 Audio block diagram........8–16
Figure 64 Internal microphone circuitry........8–17
Figure 65 Vibra circuitry........8–18
Figure 66 USB interface to engine........8–18
Figure 67 Bluetooth interface block diagram........8–19
Figure 68 IR module pin ordering........8–19

Phone description

Introduction

This chapter describes the baseband module including engine, power management, interfaces, audio etc.

The baseband is based on BB5.0 with a RAPGSM main processor and Retu/Tahvo energy management. All blocks that require high voltage process are in Tahvo and all other in Retu. The RF part is based on the ASIC Ahne.

RM-115 and RM-126 are quadband phones, operating on the GSM850/900/1800/1900 bands.

The phone is a fold phone, with one main part and one top board. They are connected with a micro coax cable harness.

Main board includes: BB and RF blocks, Bluetooth, etc.

Top board includes: small LCD display, HWA, camera and earpiece

Characteristic components

Function	Name	Item
RF ASIC	Ahne	N7505
Energy management	Retu Tahvo	D2200 N2300
Main processor	RAPGSM	D2800
Memory	Combo: 128 Mbit SDRAM & 256 Mbit NOR flash	D3000
Front end module	Power amplifier and Antenna Switch	N7520
Antenna	Antenna module assy (in acoustic chamber)	I226
System connector	PopPort	X2001
Battery	BL-4C, 3.7 V, 820 mAh, Li-ion	
Fold detection	1 hall sensor and 1 permanent magnet	Sensor: N2400 (main-PWB)
Bluetooth	BC4-ROM	N6030
IrDA	**Note:** Not supported by all variants!	N2600
FM radio	TEA5761, single chip **Note:** Not supported by all variants!	N6156
IHF Speaker	In acoustic chamber	I227
Earpiece	7/11	I009
Microphone		I225
Vibra	SMD VIBRA MOTOR	M2100
Charger connector	2 mm Nokia charger interface	I222
Camera	1.3 Mpix SMIA85, no flash light	I010
LED driver		N2301
RTC		G2200

PWB overview

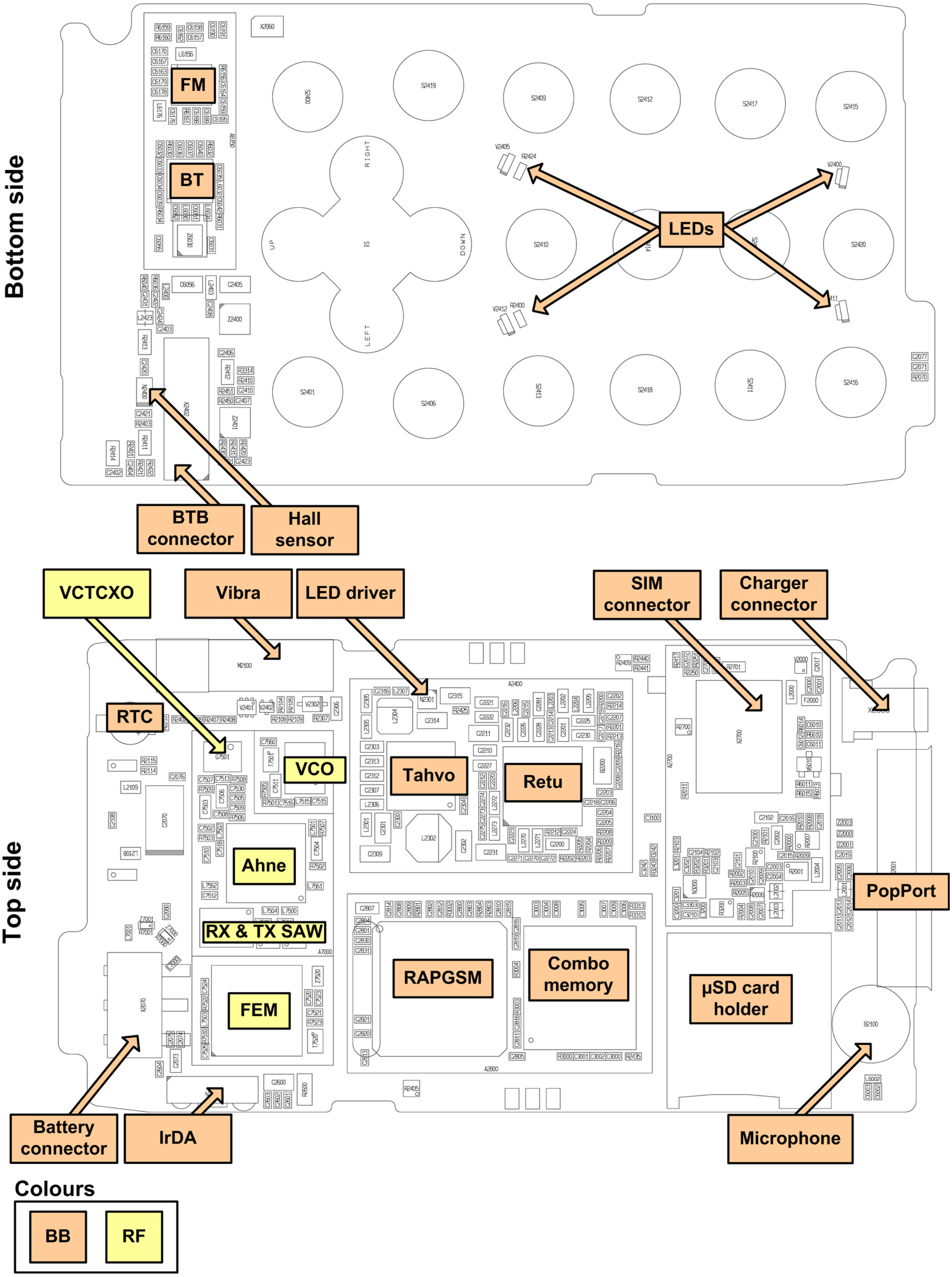

Bottom side
FM
BT
LEDs
BTB connector
Hall sensor
Top side
VCTCXO
Vibra
LED driver
SIM connector
Charger connector
RTC
VCO
Tahvo
Retu
Ahne
RX & TX SAW
PopPort
RAPGSM
Combo memory
FEM
µSD card holder
Battery connector
IrDA
Microphone
Colours
BB
RF

Figure 51 PWB overview

System block diagram

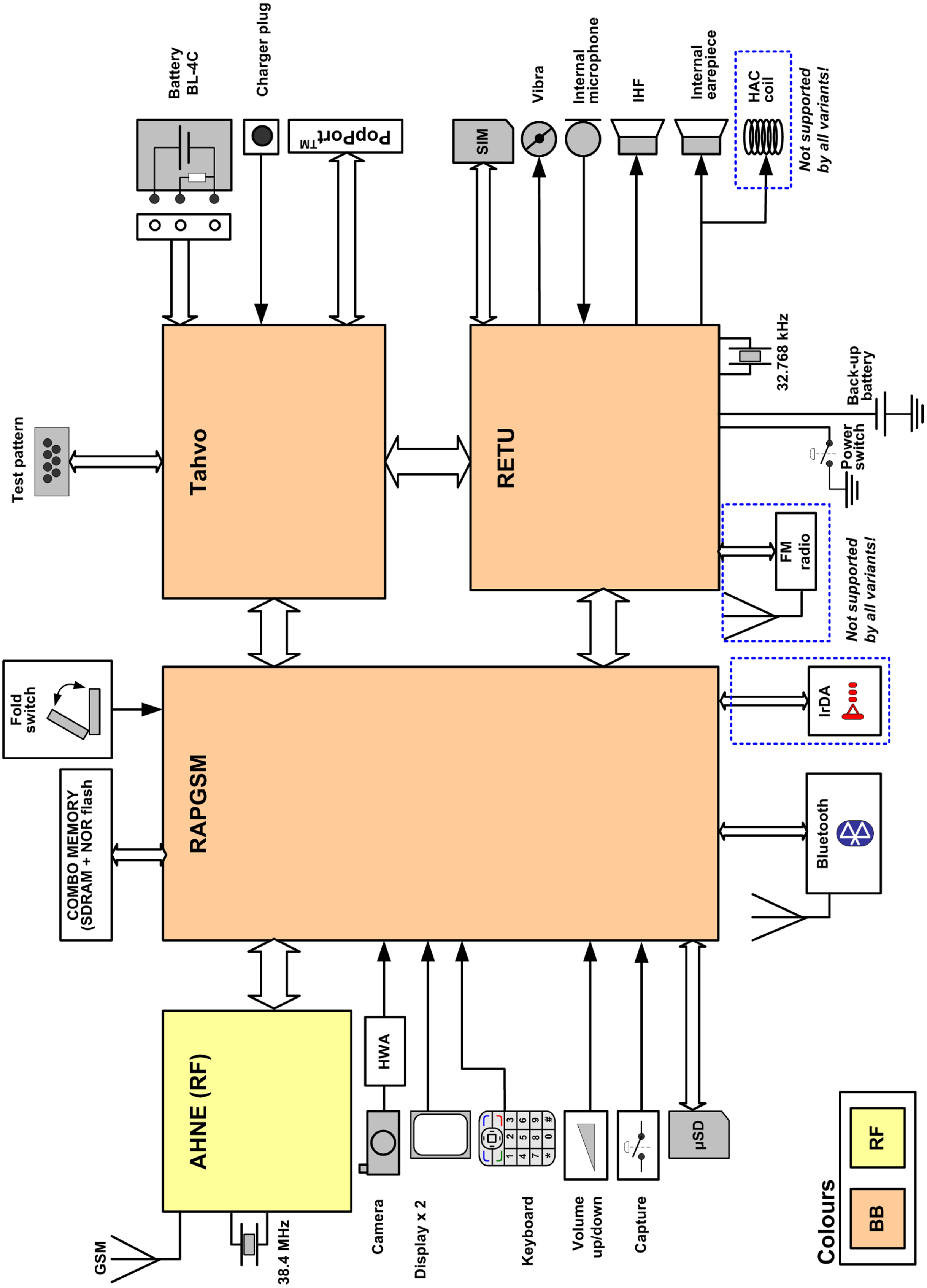

Battery
BL-4C
Charger plug
Pop-Port™
SIM
Vibra
Internal microphone
IHF
Internal earepiece
HAC coil
Not supported by all variants!
Test pattern
Tahvo
RETU
32.768 kHz
Back-up battery
Power switch
FM radio
Not supported by all variants!
Fold switch
COMBO MEMORY (SDRAM + NOR flash)
RAPGSM
IrDA
Bluetooth
AHNE (RF)
HWA
GSM
38.4 MHz
Camera
Display x 2
Keyboard
Volume up/down
Capture
µSD
Colours
RF
BB

Figure 52 System block diagram

Board and module connections

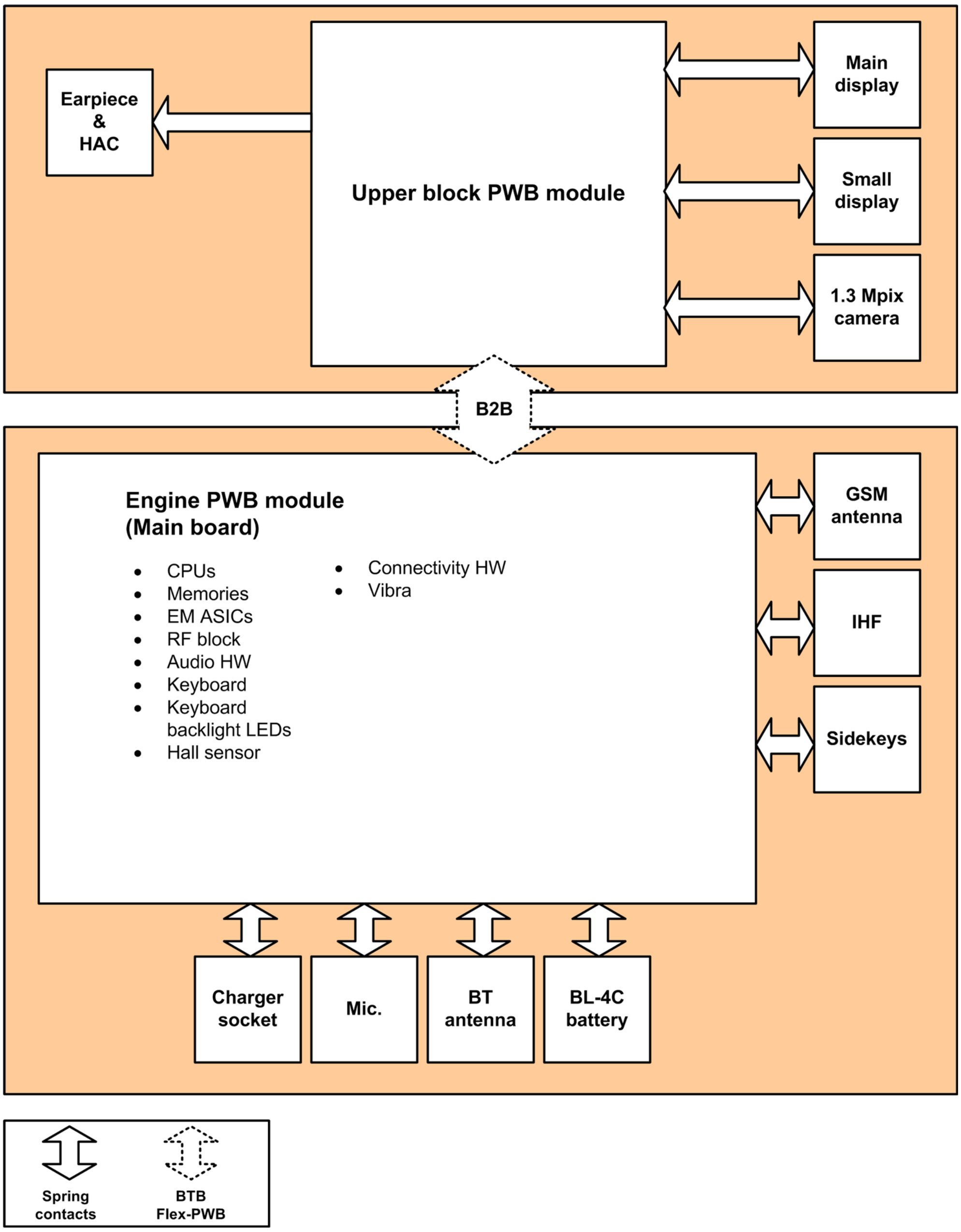

Earpiece
&
HAC
Upper block PWB module
Main display
Small display
1.3 Mpix camera
B2B
Engine PWB module
(Main board)
CPUs
Memories
EM ASICs
RF block
Audio HW
Keyboard
Keyboard backlight LEDs
Hall sensor
Connectivity HW
Vibra
GSM antenna
IHF
Sidekeys
Charger socket
Mic.
BT antenna
BL-4C battery
Spring contacts
BTB Flex-PWB

Figure 53 Board and module connections

Engine

Engine modules

The engine contains

- RF module with Ahne ASIC
- Main processor with integrated memory (Baseband)
- Energy management - Retu and Tahvo (Baseband)
- SDRAM and NOR flash memories

RF engine

The RF module performs the high frequency operations of the engine for GSM. In both transmitter and receiver, the modulator and demodulator operate at the channel frequency.

The core components of the RF module are:

- Ahne RF ASIC (application specific integrated circuit)
- Front end module (FEM) module (Power amplifier and Antenna switch)

The RF engine also includes:

- Voltage controlled oscillators (VCO and VCTCXO)
- SAW filters

The baseband section controls the RF module through the serial bus, RFBus. This passes information about eg. frequency band and mode of operation. Ahne RF ASIC controls the mode of operation, and further sends control signals to the front end module.

In addition to the RFBus there are other interface signals for the power control loop, VCTCXO control and for the modulated waveforms.

Main processor

The main processor in this device is RAPGSM, a BB5.0 ASIC.

Some of its interfaces, processors and controllers are:

- General purpose UARTs
- Processor modules
- I2C (between ICs) interface
- GSM coder
- Interfaces to user interface, SIM and MMC
- Accessory interface
- Handling of RF-BB interface
- I/O voltage = 1.8 V, Core voltage <1.8 V

Energy management

Two ASICs manages the energy in the phone; Retu and Tahvo. Together they cover the analogue audio and energy management function needs.

Tahvo

All blocks that need a special silicon process are included in Tahvo.

Tahvos main features are:

- Energy management control
- Supply voltage generation
- Charge control
- Digital core supply
- Current control for LED supply

Retu

The blocks that do not have special needs are included in Retu.

Retu controls for example:

- Audio block
- SIM
- FM radio

Modes of operation

The functional behavior can be divided into seven different states. Each of these states will affect the general functionality of the phone:

- No supply
- Backup
- Power off
- Reset
- Power on
- Deep sleep

Battery and charging

Battery

- Type: BL-4C, Li-Ion
- Capacity: 820 mAh
- BSI resistor nominal value: 75 kΩ

Battery temperature is measured on the NTC on the main board.

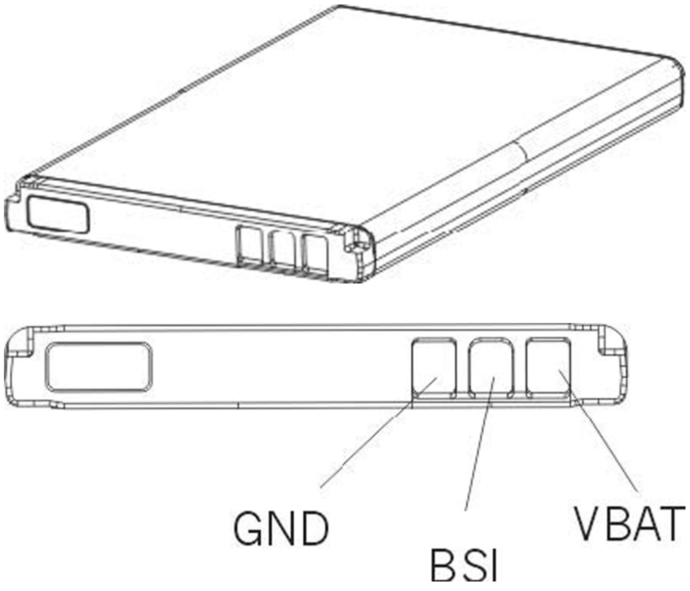


Figure 54 Battery BL-4C

Battery connector

The battery connector has three poles:

- BSI (Battery size indicator)
- GND (Ground)
- VBAT (Battery voltage)

The BSI line is used to recognize the battery capacity by a battery internal pull down resistor.

Charging

This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The old standard charger (3.5 mm) can be used together with the CA-44 charger adapter.

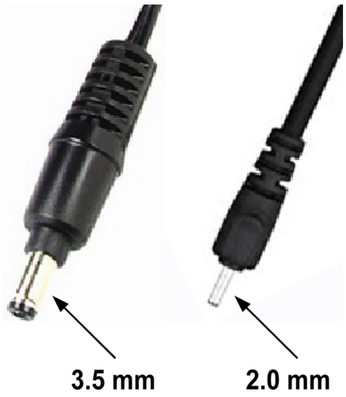


Figure 55 Old (left) and new (right) charger plugs

Charging is controlled by energy management, and external components are needed to protect the baseband module against EMC, reverse polarity and transient frequency deviation.

Test interface

The test interface is placed on the main board, accessible when the battery is removed from the phone. The interface can be used for service and test purposes.

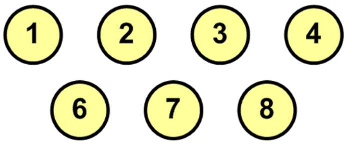


Figure 56 Test interface

Interfaces

PopPort™ system connector

The PopPort™ connector is an interface between the phone and the accessories. The configuration may vary between different phone models. In this model it includes:

- Audio
- Power out
- Detection/controlling
- USB
- FBus
- Charging

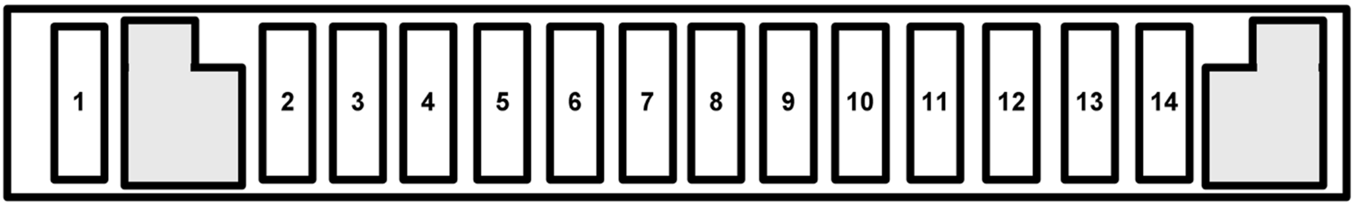


Figure 57 PopPort ™connector pins

Table 15 PopPort™ connector pins and signals

Pin #	Signal	Pin #	Signal
1	Charge	8	USB Data GND
2	Charge GND	9	XMIC N
3	ACI	10	XMIC P
4	Vout	11	XEAR N
5	USB VBus	12	XEAR P
6	USB D+/FBus_RX	13	XEAR RN
7	USB D-/FBus_TX	14	XEAR RP

FM radio

This phone uses a single-chip electronically tuned FM stereo radio with low voltage application.

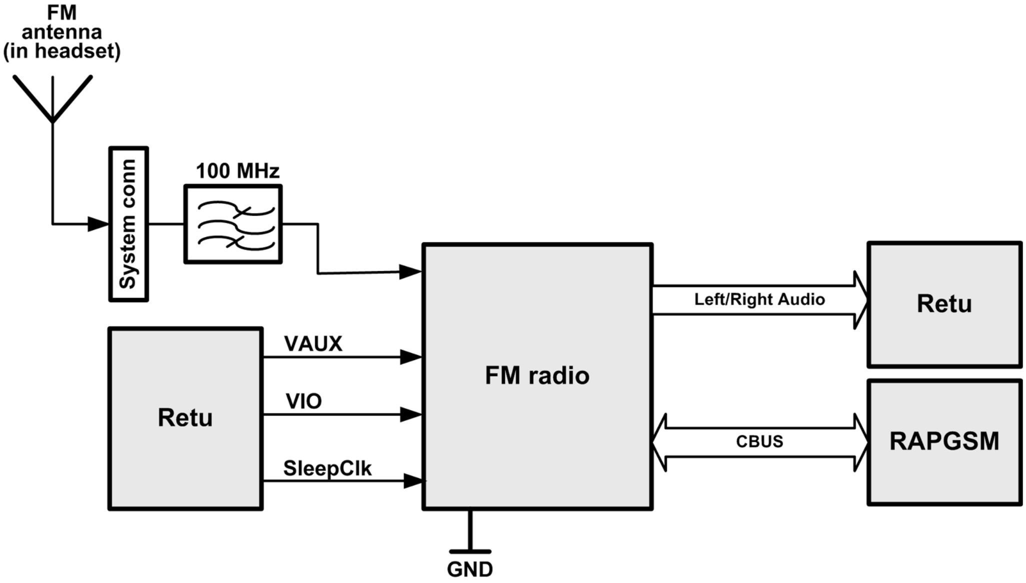

FM antenna (in headset)
System conn
100 MHz
Retu
VAUX
VIO
SleepClk
FM radio
GND
Left/Right Audio
Retu
CBUS
RAPGSM

Figure 58 FM radio interface

Camera

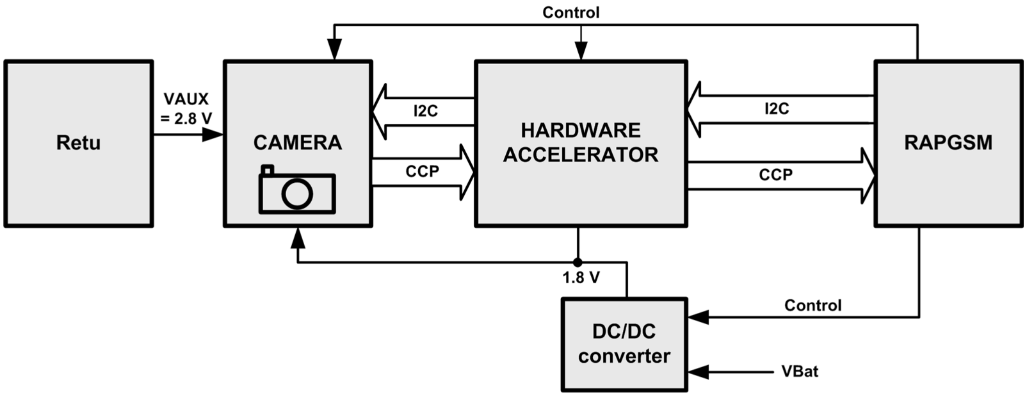

Control
Retu
VAUX = 2.8 V
CAMERA
I2C
CCP
HARDWARE ACCELERATOR
I2C
CCP
RAPGSM
1.8 V
DC/DC converter
Control
VBat

Figure 59 Camera interface

This phone is equipped with a 1.3 megapixel camera. The module has only one operating mode; raw pixel data output.

A hardware accelerator includes features like pixel defect correction, colour interpolation, image sharpness enhancement, selective noise filtering, cropping and scaling. The image can be JPEG-compressed in real-time. The hardware accelerator also performs sensor housekeeping functions such as automatic exposure and white balance controls.

SIM

The SIM interface is the electrical interface between the SIM card and the mobile phone, located in two ASICs; RAPGSM and Retu.

The data communication between the SIM card and the phone is asynchronous half duplex.

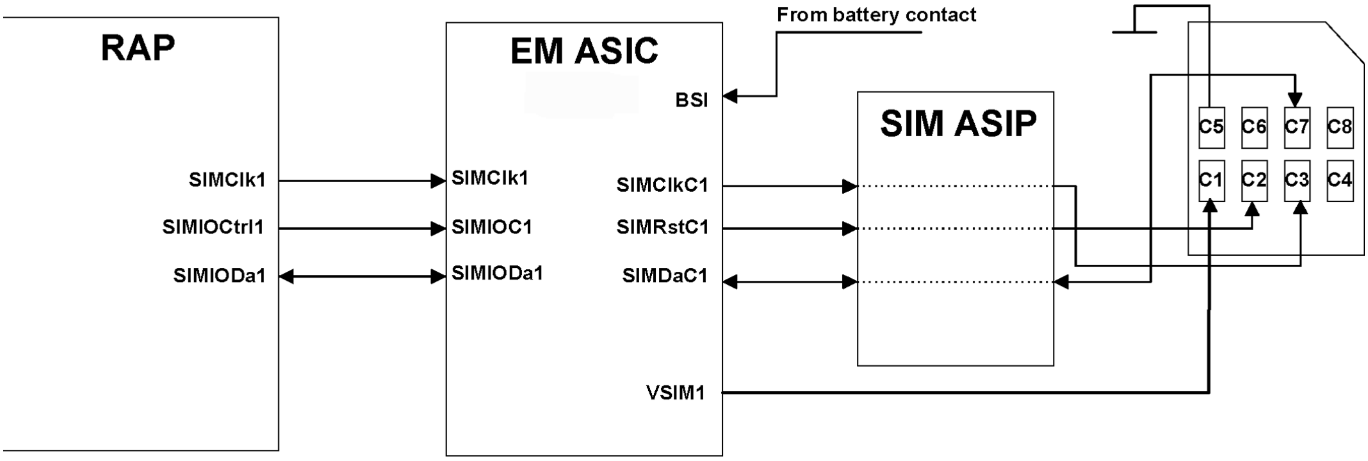

RAP
SIMClk1
SIMIOCtrl1
SIMIODa1
EM ASIC
BSI
SIMClk1
SIMIOC1
SIMIODa1
SIMClkC1
SIMRstC1
SIMDaC1
VSIM1
From battery contact
SIM ASIP
C5
C6
C7
C8
C1
C2
C3
C4

Figure 60 RAPGSM/Retu SIM interface connections

SIM Logic level shifting

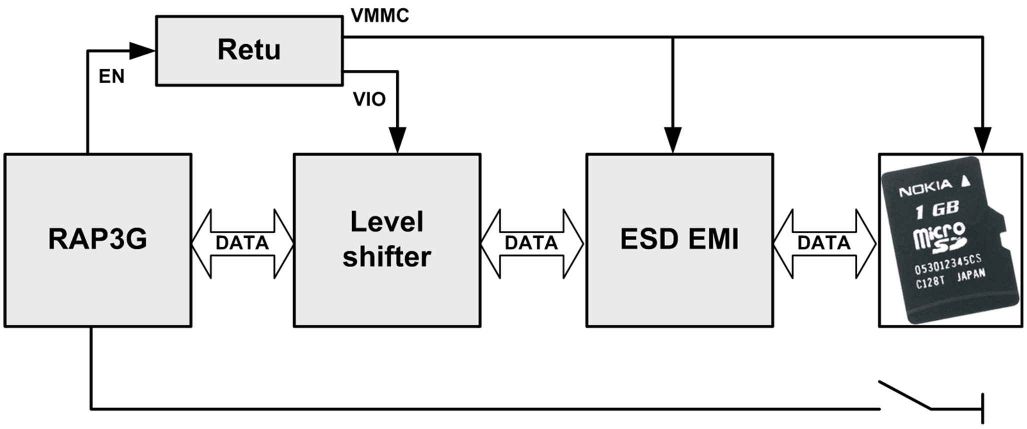
The SIM interface can support 3V and 1.8V SIM cards.

SIM Power up/down

The SIM power up/down sequence is generated in Retu. This means that Retu generates the reset switch (RST) signal to the SIM. In addition, the SIMCardDet signal is connected to Retu.

The SIM interface is powered up when the SIMCardDet signal indicates “card in”.

µSD card interface


Retu
VMMC
EN
VIO
RAP3G
DATA
Level shifter
DATA
ESD EMI
DATA
NOKIA
1 GB
micro SD
053012345CS
C128T JAPAN

The µSD card is connected to RAP3G by an external levelshifter. Retu provides voltages:

- VMMC: 2.85 V
- VIO: 1.8 V

The card removal is detected by a push detect switch.

User interface

User interface

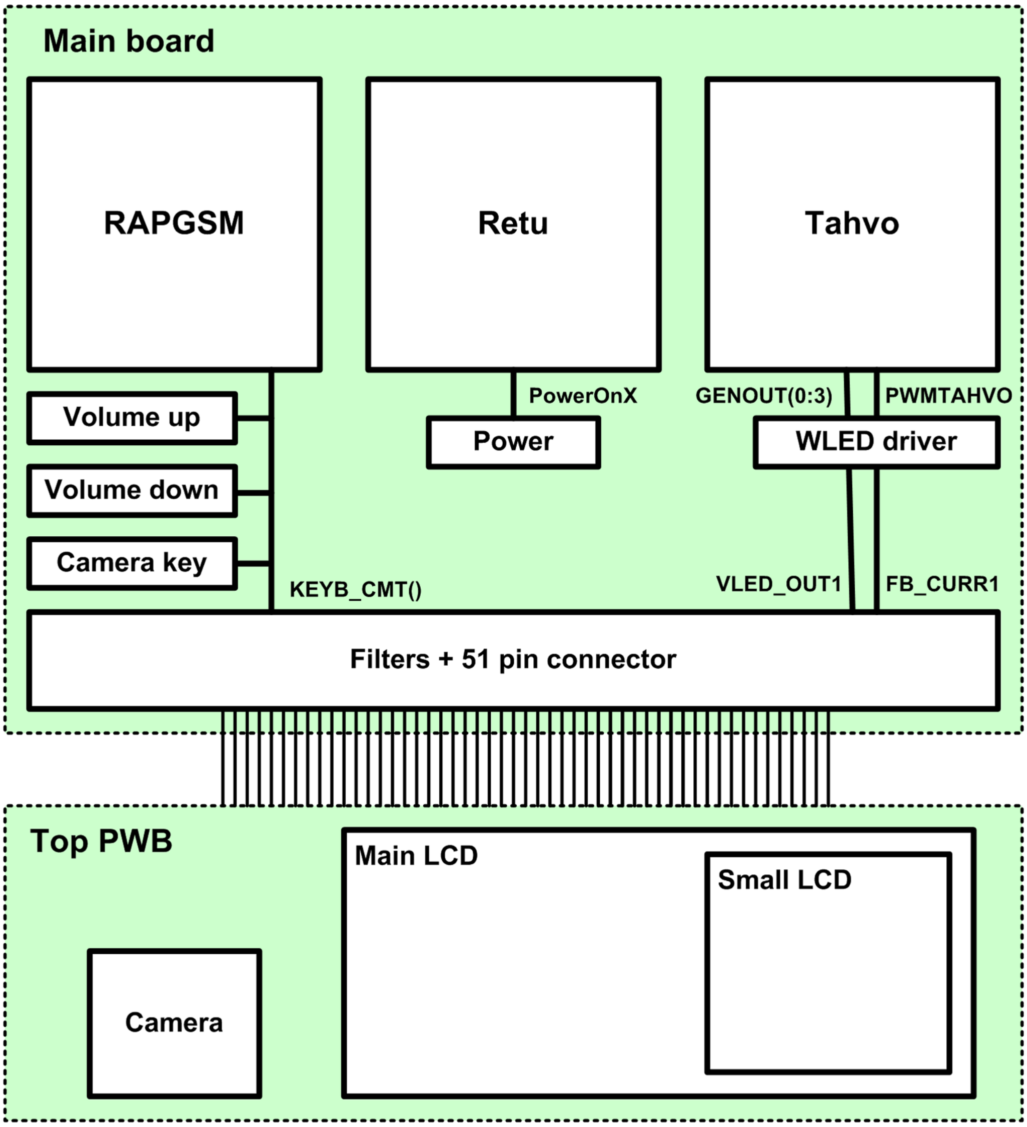

Main board
RAPGSM
Retu
Tahvo
Volume up
Volume down
Camera key
PowerOnX
Power
GENOUT(0:3)
PWMTAHVO
WLED driver
KEYB_CMT()
VLED_OUT1
FB_CURR1
Filters + 51 pin connector
Top PWB
Main LCD
Small LCD
Camera

Figure 61 User interface block diagram

Display and display backlight

The main display includes four white LEDs for display backlights inside of the display module. Display backlight current is monitored using LED driver feedback input

Keyboard and keyboard backlight

Numeric keys, camera, power and volume up/down keys are placed on the main board.

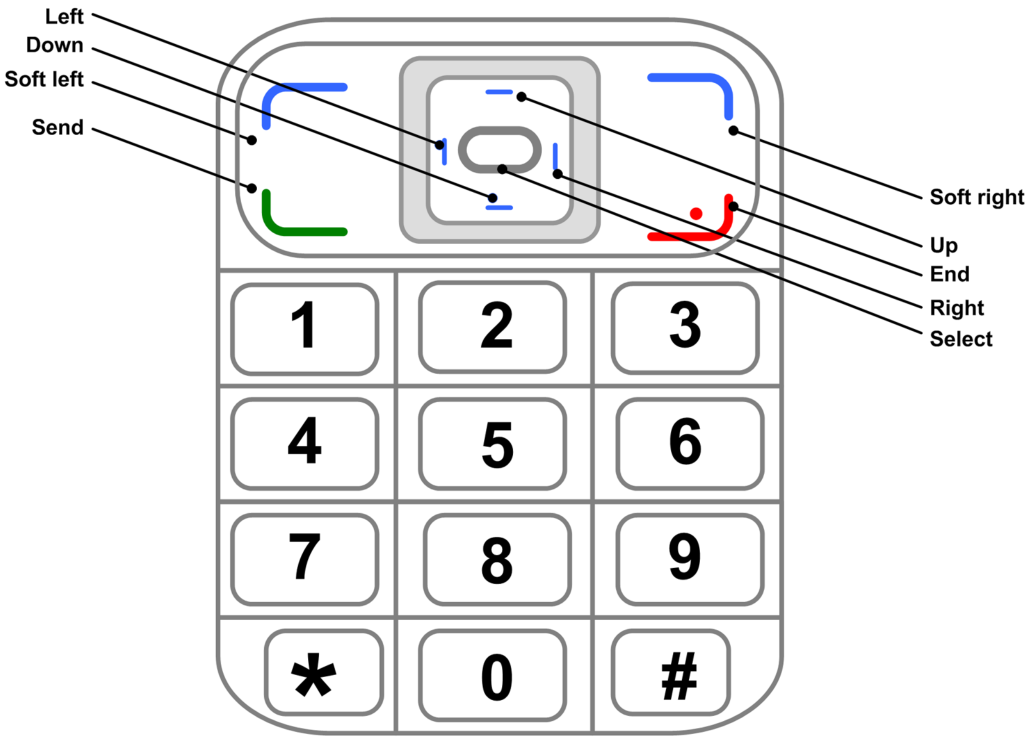


Figure 62 Keyboard layout

Table 16 Key signal matrix

GENIO		39	40	41	42	GND
		KEYB_CMT8 (COL0)	KEYB_CMT9 (COL1)	KEYB_CMT10 (COL2)	KEYB_CMT11 (COL3)	
32	KEYB_CMT0 (ROW0)	Soft left	Soft right	Left	Right	
33	KEYB_CMT1 (ROW1)	Select	Send	Up	Down	
34	KEYB_CMT2 (ROW2)	7	2	3	8	
35	KEYB_CMT3 (ROW3)	5		1	6	
36	KEYB_CMT4 (ROW4)	9	*	Vol+	#	
37	KEYB_CMT5 (ROW5)	End	0	Vol-	4	
38	KEYB_CMT6 (ROW6)					Camera

There are four white LEDs placed on the keyboard PWB for illumination of the keyboard. Supply source for backlights is implemented using an external white LED driver. The driver increases battery voltage up to 18V.

Fold switch

The detection of the position of the fold is made through a Hall sensor, connected to GENIO45, and a magnet. The magnet is positioned in the upper block.

When the fold is opened, the applied magnetic field is high. This is sensed by an internal switch, also connected to GND. When the fold is closed, the Hall sensor is fluxed by magnetic field.

Audio concept

Audio hardware architecture

The functional core of the audio hardware is built around two ASICs: RAPGSM engine ASIC and the mixed-signal ASIC Retu.

Retu provides an interface for the transducers and the accessory connector.

There are four audio transducers:

- Dynamic earpiece
- Dynamic speaker
- Microphone module

In addition to the audio transducers, Retu also provides an output for the dynamic vibra component.

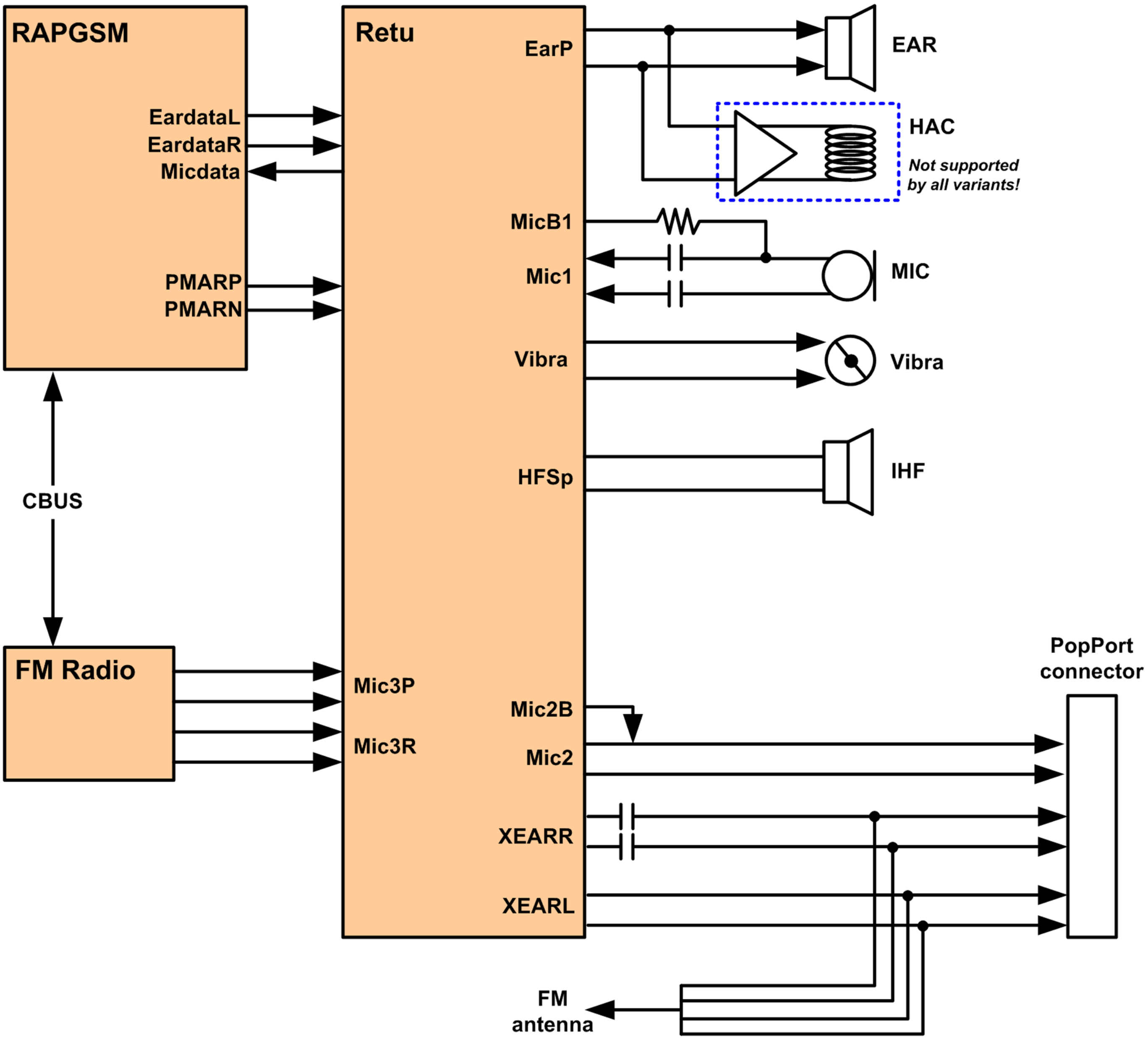

RAPGSM
EardataL
EardataR
Micdata
PMARP
PMARN
CBUS
FM Radio
Retu
EarP
MicB1
Mic1
Vibra
HFSp
Mic3P
Mic3R
Mic2B
Mic2
XEARR
XEARL
EAR
HAC
Not supported by all variants!
MIC
Vibra
IHF
PopPort connector
FM antenna

Figure 63 Audio block diagram

Internal microphone

Internal microphone is used for HandPortable (HP) and Internal HandsFree (IHF) call modes.

An analogue electret microphone is connected to N2200 Mic1P and Mic1N inputs via asymmetric electrical connection.

The microphone is biased by N2200 MicB1 bias voltage output.

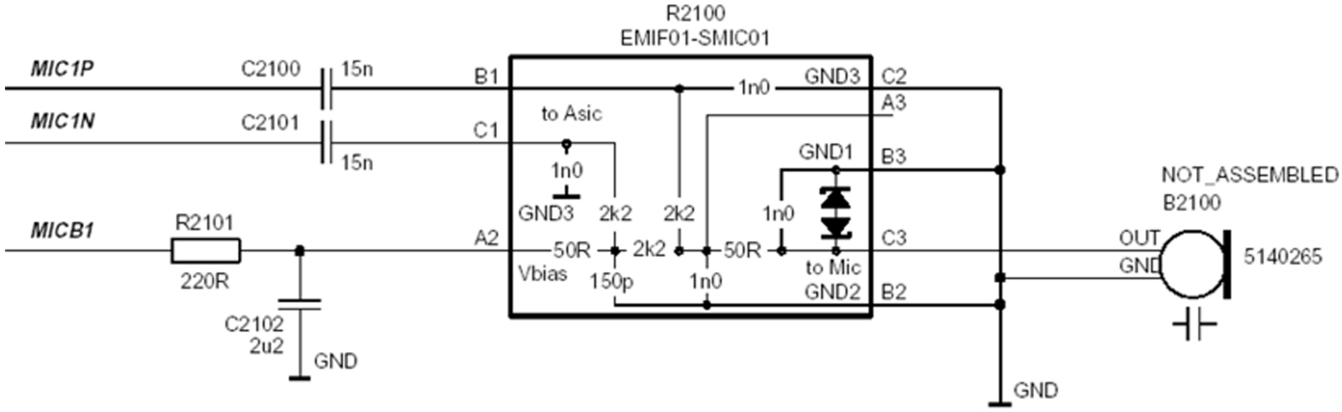

R2100
EMIF01-SMIC01
MIC1P
C2100
15n
B1
MIC1N
C2101
15n
C1
to Asic
1n0
GND3
C2
A3
GND1
B3
1n0
GND3
2k2
2k2
1n0
NOT_ASSEMBLED
B2100
MICB1
R2101
A2
50R
2k2
50R
C3
OUT
GND
5140265
220R
Vbias
150p
1n0
to Mic
GND2
B2
C2102
2u2
GND
GND

Figure 64 Internal microphone circuitry

External microphone

Galvanic accessories are connected to the system connector (Pop-Port^{TM}).

Accessory audio mode is automatically enabled/disabled during connection/disconnection of dedicated phone accessories.

Internal earpiece

Internal earpiece is used for the HandPortable (HP) call mode. A dynamic earpiece capsule is connected to Retu's differential output EarP and EarN.

Internal speaker (IHF)

The internal speaker is used for Internal handsfree (IHF) call mode, ringing tones, and listening to music files.

External earpiece

All galvanic accessories are connected to the system connector (Pop-Port™).

The accessory audio mode is automatically enabled/disabled during connection/disconnection of dedicated phone accessories.

Vibra circuitry

Vibra is used for vibra-alarm function.

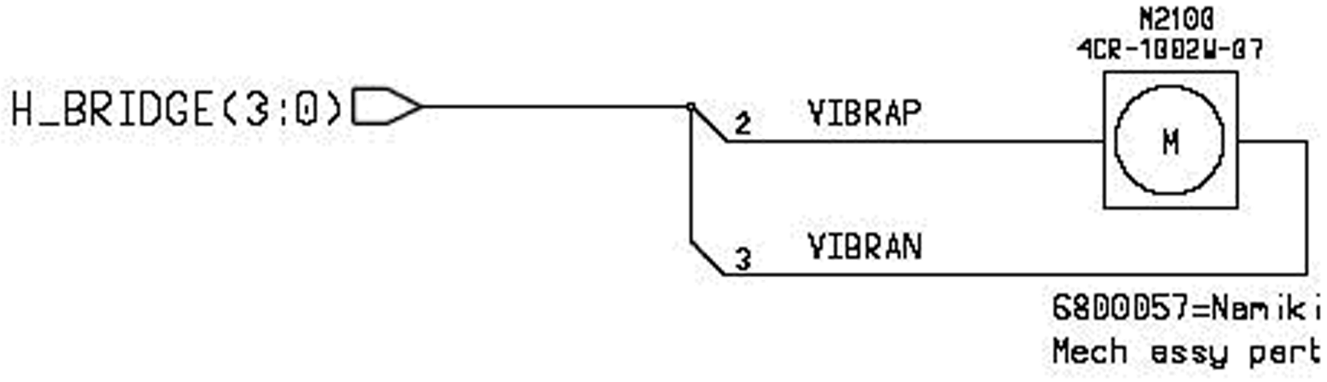

N2100
4CR-1002W-07
H_BRIDGE(3:0)
2
VIBRAP
M
3
VIBRAN
68D0057=Namiki
Mech assy part

Figure 65 Vibra circuitry

Connections

USB interface

USB (Universal serial bus) provides a wired connectivity between host PC and peripheral devices.

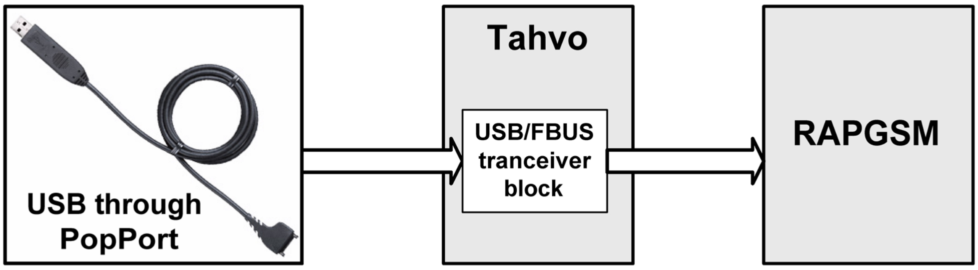

USB through
PopPort
Tahvo
USB/FBUS
tranceiver
block
RAPGSM

Figure 66 USB interface to engine

The Nokia USB device solution is supported using the Wireless 2 Function Controller (W2FC) core. This core is included in the RAPGSM. The core completes several USB functions automatically and is controlled by the MCU.

The USB solution is also compatible with USB 2.0, with a full speed of 12 Mbps.

Bluetooth

Bluetooth provides a fully digital link for communication between a master unit and one or more slave units.

This bluetooth solution is a single chip solution.

Bluetooth connects to RAPGSM on the GENIO and GPIO busses.

The Bluetooth module is provided with power from VBat.

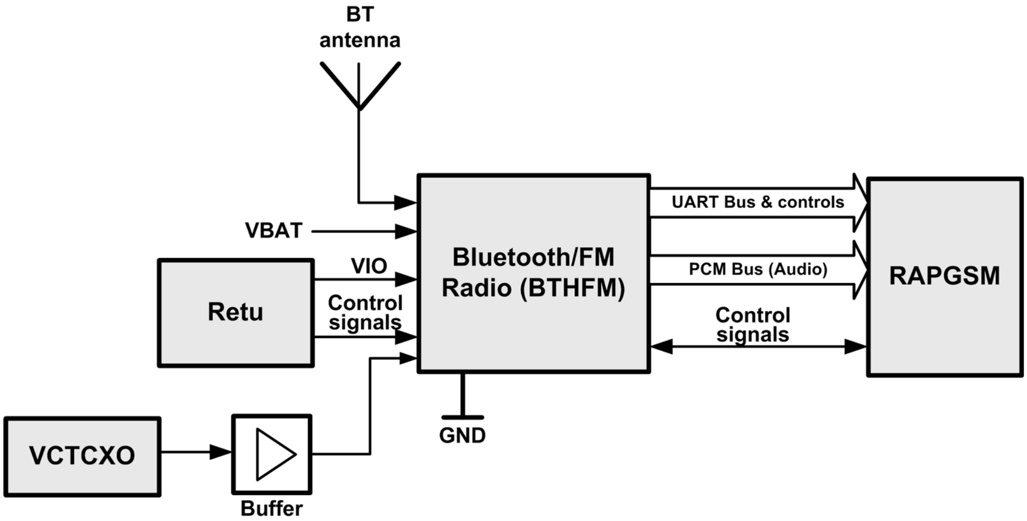

BT antenna
VBAT
VIO
Control signals
Retu
Bluetooth/FM Radio (BTHFM)
UART Bus & controls
PCM Bus (Audio)
Control signals
RAPGSM
GND
VCTCXO
Buffer

Figure 67 Bluetooth interface block diagram

IrDA

IrDA is a fully digital peer-to-peer data link between IrDA units. The link is based on the serial transmission of data as pulses of infrared light. The IrDA module contains both RX part and TX part.

The IrDA interface is integrated in RAPGSM.

Datarate: 1.152 Mbit

Max. operating distance: 1 m

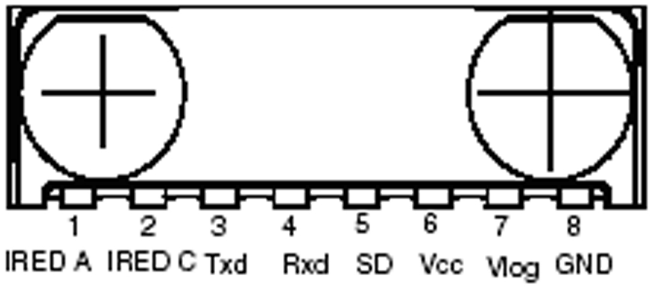

1 IRED A
2 IRED C
3 Txd
4 Rxd
5 SD
6 Vcc
7 Vlog
8 GND

Figure 68 IR module pin ordering

Technical specifications

General specifications

Unit	Dimension (mm)	Weight (g)	Volume (cc)
Transceiver with BL-4C 820 mAh Li-Ion battery pack	91.7x47.8x20	112 g	75 cc

Battery endurance

Battery	Talk time	Standby time
BL-4C 820 mAh Li-ion	3 - 3.5 hours	Up to 300 hours

Note: Variation in operation times will occur depending on SIM card, network settings and usage. Talk time is increased by up to 30% if half rate is active, and reduced by 5% if enhanced full rate is active.

Environmental conditions

Temperature

Temperature range	Min ºC	Max ºC
Operational (all specs met)	-5	+55
Functional (reduced performance)	-30	+70
Storage	-30	+85

The HW module complies with the SPR4 Operating Conditions.

Humidity

Relative humidity range is 5...95%.

The hardware module is not protected against water. Condensed or splashed water might cause malfunction. Any submerge of the phone will cause permanent damage. Long-term high humidity, with condensation, will cause permanent damage because of corrosion.

The hardware module complies with the SPR4 Operating Conditions.

Electrical characteristics

Table 17 Normal and extreme voltages

Voltage	Voltage (V)	Condition
General conditions		
Nominal voltage	4.0	
Lower extreme voltage	3.06	a
Higher extreme voltage	4.2	b
HW shutdown voltages		
Vmstr+	2.1 ± 0,1	Off to on
Vmstr-	1.9 ± 0,1	On to off
SW shutdown voltages		
SW shutdown	3.06	In call
SW shutdown	3.2	In idle
Min operating voltage		
Vcoff+	3. 1 ± 0,1	Off to on
Vcoff-	2. 8 ± 0,1	On to off

a. ADC settings in the SW might shutdown the phone above this value.

b. During fast charging of an empty battery, this voltage might exceed this value. Voltages between 4.20 and 4.60 might appear for a short while.

Main RF characteristics

Table 18 Channel numbers and frequencies

System	Channel number	TX frequency	RX frequency	Unit
GSM850	128 <= n <= 251	F = 824.2 + 0.2*(n - 128)	F = 869.2 + 0.2*(n-128)	MHz
GSM900	0 < =n <= 124	F = 890 + 0.2*n	F = 935 + 0.2*n	MHz
	975 <= n <= 1023	F = 890 + 0.2* (n - 1024)	F = 935 + 0.2*(n -1024)	MHz
GSM1800	512 <= n <= 885	F = 1710.2 + 0.2* (n - 512)	F = 1805.2 + 0.2* (n-512)	MHz
GSM1900	512 <= n <= 810	F = 1850.2 + 0.2* (n - 512)	F = 1930.2 + 0.2* (n-512)	MHz

Table 19 Main RF characteristics

Parameter	Unit and value
Cellular systems	GSM850/EGSM900/GSM1800/GSM1900
RX Frequency range	GSM850: 869 ... 894 MHz
	EGSM900: 925 ... 960 MHz
	GSM1800: 1805...1880 MHz
	GSM1900: 1930...1990 MHz
TX Frequency range	GSM850: 824 ... 849 MHz
	EGSM900: 880 ... 915 MHz
	GSM1800: 1710 ...1785 MHz
	GSM1900: 1850...1910 MHz
Duplex spacing	GSM850: 45 MHz
	EGSM900: 45 MHz
	GSM1800: 95 MHz
	GSM1900: 80 MHz
Channel spacing	200 kHz
Number of RF channels	GSM850: 124
	EGSM900: 174
	GSM1800: 374
	GSM1900: 300

Parameter	Unit and value
Output Power	GSM850: GSMK 5...33 dBm
	GSM850: 8-PSK 5...26.5 dBm
	EGSM900: GSMK 5...33 dBm
	EGSM900: 8-PSK 5...26.5 dBm
	GSM1800: GSMK 0...30 dBm
	GSM1800: 8-PSK 0...25.5 dBm
	GSM1900: GSMK 0...30 dBm
	GSM1900: 8-PSK 0...25.5 dBm
Number of power levels GMSK	GSM850: 15
	EGSM900: 15
	GSM1800: 16
	GSM1900: 16
Number of power levels 8-PSK	GSM850: 12
	EGSM900: 12
	GSM1800: 14
	GSM1900: 14

Table 20 Transmitter characteristics

Item	Values
Type	Direct conversion, nonlinear, FDMA/TDMA
LO frequency range	GSM850: 3296...3576 MHz (4 x TX freq)
	EGSM900: 3520...3660 MHz (4 x TX freq)
	GSM1800: 3420...3570 MHz (2 x TX freq)
	GSM1900: 3700...3820 MHz (2 x TX freq)
Output power (GSM850/EGSM900/GSM1800/ GSM1900)	GMSK 33/33/30/30 dBm 8-PSK 26.5/26.5/25.5/25.5 dBm
Gain control range	min. 30 dB
Phase error (RMS/peak), GMSK	5 deg./20 deg. peak
EVM (RMS/peak), 8-PSK	10%/30%

Table 21 Receiver characteristics

Item	Values
Type	Direct conversion, Linear, FDMA/TDMA

Item	Values
LO frequencies	GSM850: 3476..3576 MHz (4 x RX freq)
	EGSM900: 3700...3840 MHz (4 x RX freq)
	GSM1800: 3610...3760 MHz (2 x RX freq)
	GSM1900: 3860...3980 MHz (2 x RX freq)
Typical 3 dB bandwidth	+/- 91 kHz
Sensitivity	min. - 102 dBm (normal condition)
Total typical receiver voltage gain (from antenna to RX ADC)	86 dB
Receiver output level (RF level -95 dBm)	40 mVpp, single-ended I/Q signals to RX ADCs

(This page left intentionally blank.)

9 — Schematics

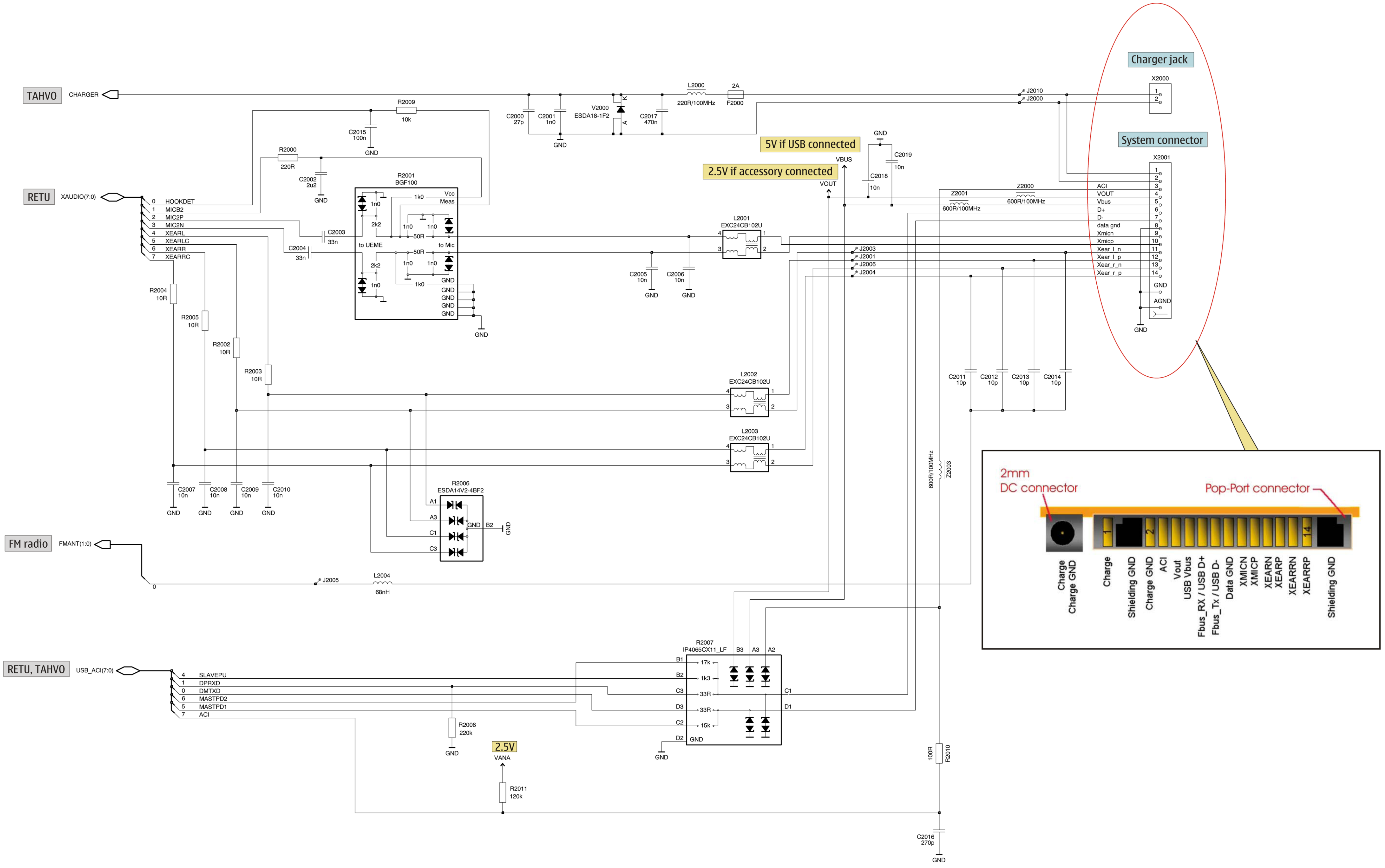
(This page left intentionally blank.)

Table of Contents

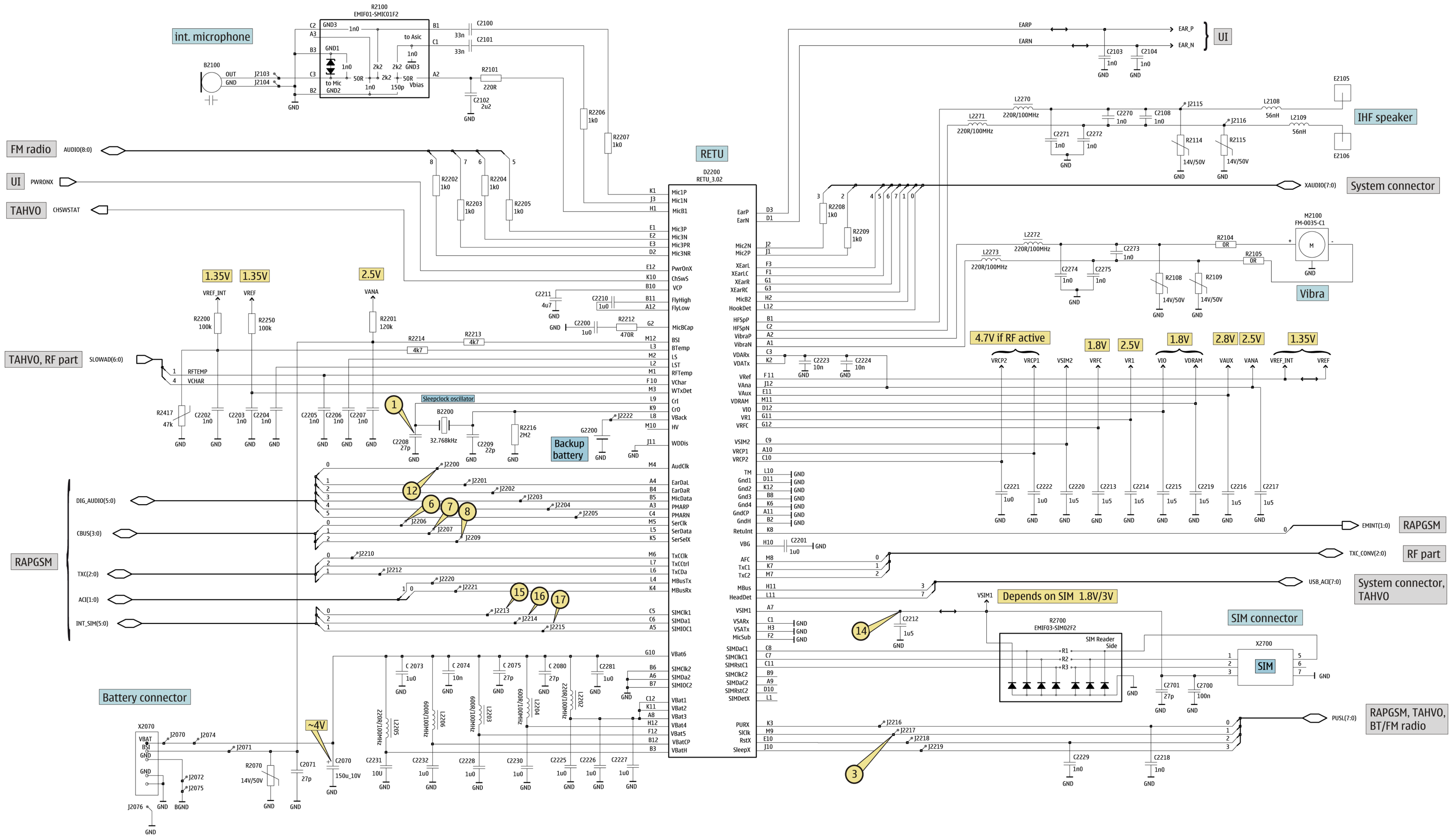
Schematics........9–4

Schematics

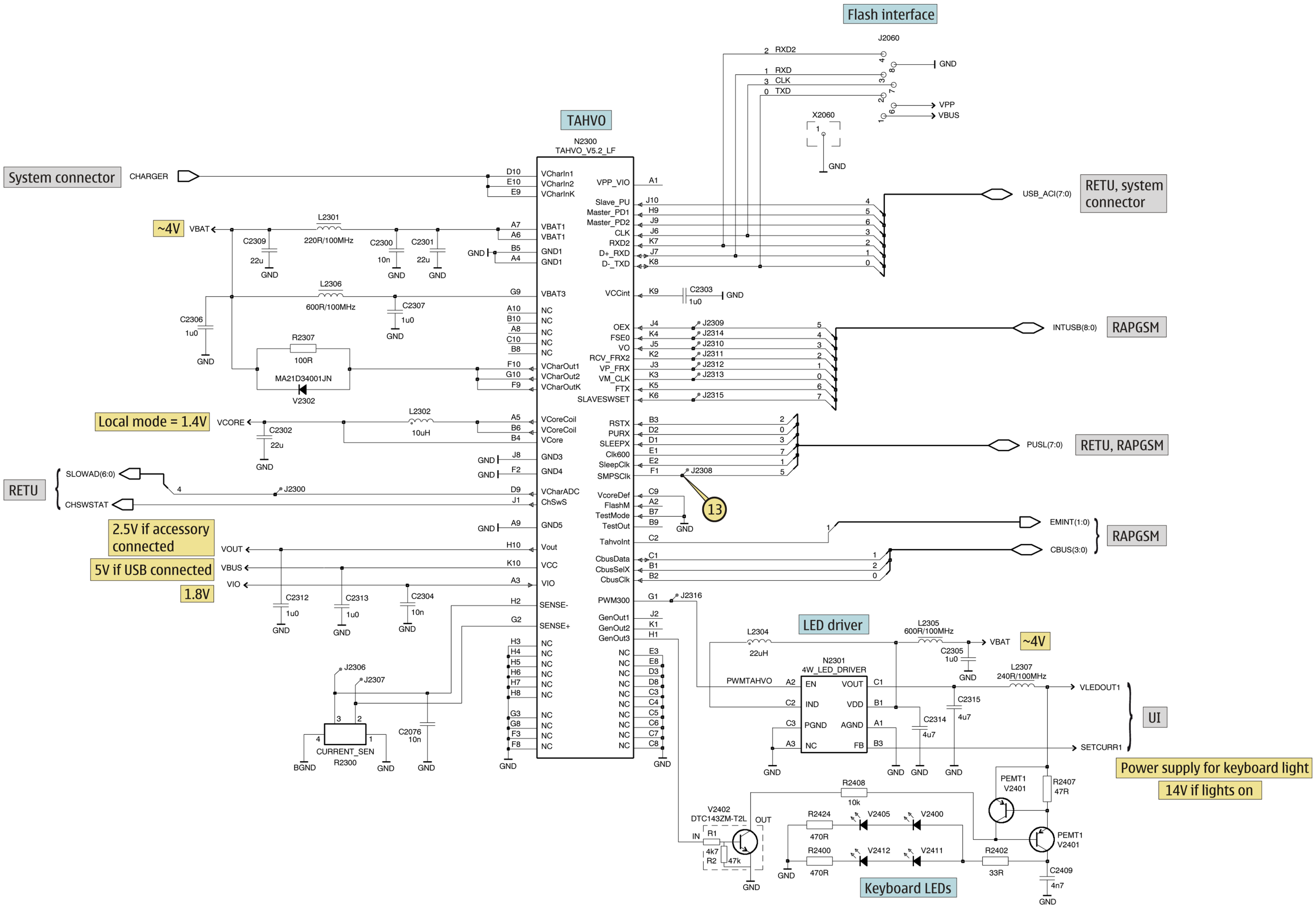
System connector


Charger jack
X2000
System connector
X2001
TAHVO
CHARGER
RETU
XAUDIO(7:0)
0 HOOKDET
1 MICB2
2 MIC2P
3 MIC2N
4 XEARL
5 XEARLC
6 XEARR
7 XEARRC
FM radio
FMANT(1:0)
RETU, TAHVO
USB_ACI(7:0)
4 SLAVEPU
1 DPRXD
0 DMTXD
6 MASTPD2
5 MASTPD1
7 ACI
R2009 10k
C2015 100n
R2000 220R
C2002 2u2
R2001 BGF100
Vcc
Meas
to UEME
to Mic
C2003 33n
C2004 33n
C2000 27p
C2001 1n0
V2000 ESDA18-1F2
C2017 470n
L2000 220R/100MHz
2A F2000
J2010
J2000
5V if USB connected
2.5V if accessory connected
VBUS
VOUT
C2018 10n
C2019 10n
Z2001 600R/100MHz
Z2000 600R/100MHz
L2001 EXC24CB102U
C2005 10n
C2006 10n
J2003
J2001
J2006
J2004
ACI
VOUT
Vbus
D+
D-
data gnd
Xmicn
Xmicp
Xear_l_n
Xear_l_p
Xear_r_n
Xear_r_p
GND
AGND
R2004 10R
R2005 10R
R2002 10R
R2003 10R
L2002 EXC24CB102U
L2003 EXC24CB102U
C2011 10p
C2012 10p
C2013 10p
C2014 10p
C2007 10n
C2008 10n
C2009 10n
C2010 10n
R2006 ESDA14V2-4BF2
J2005
L2004 68nH
Z2003 600R/100MHz
R2007 IP4065CX11_LF
17k
1k3
33R
15k
R2008 220k
2.5V
VANA
R2011 120k
R2010 100R
C2016 270p
2mm DC connector
Pop-Port connector
Charge
Charge GND
Charge
Shielding GND
Charge GND
ACI
Vout
USB Vbus
Fbus_RX / USB D+
Fbus_Tx / USB D-
Data GND
XMICN
XMICP
XEARN
XEARP
XEARRN
XEARRP
Shielding GND

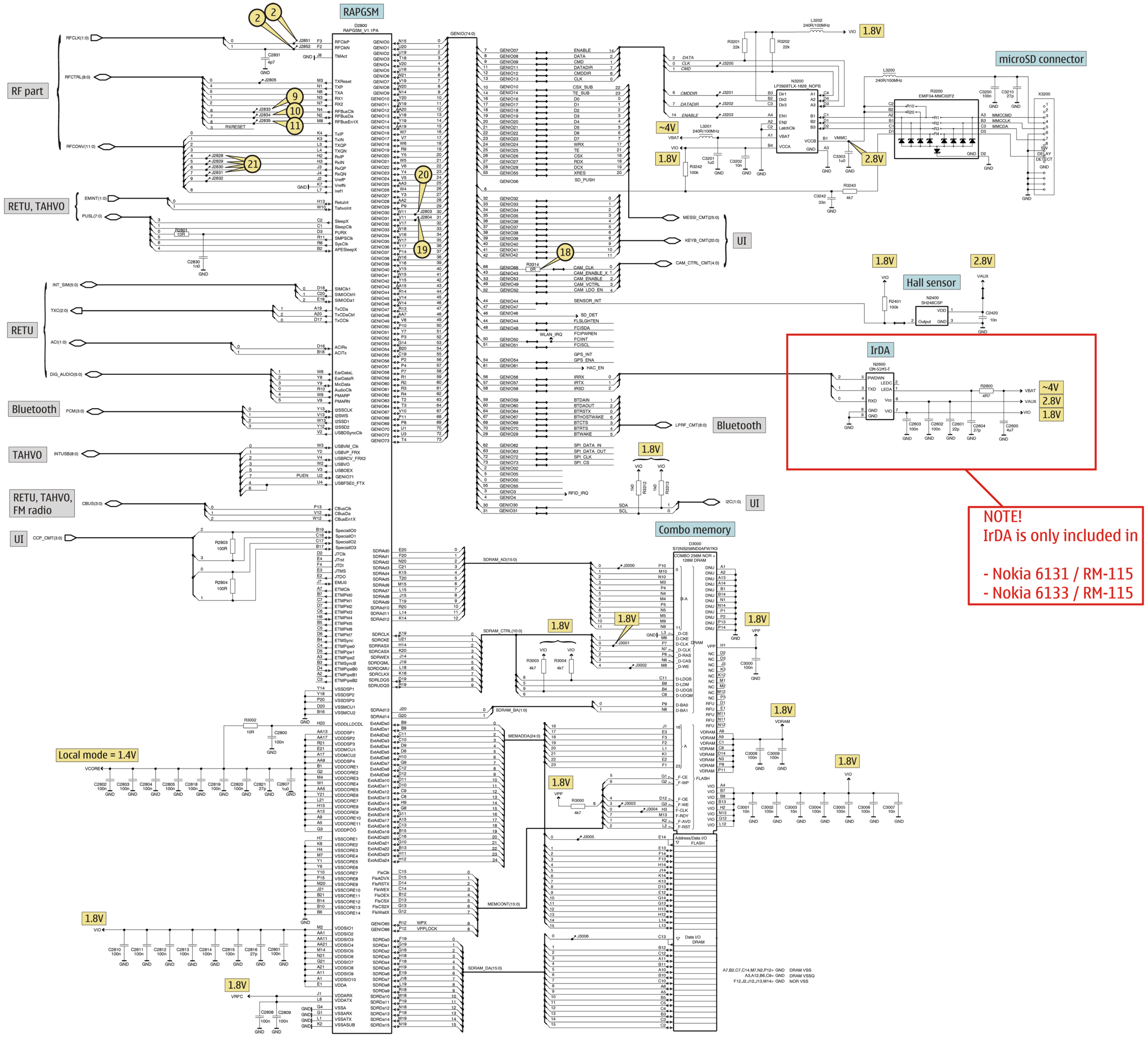
RETU, SIM, Audio


int. microphone
B2100
R2100
EMIF01-SMIC01F2
C2100
C2101
C2102
R2101
220R
FM radio
AUDIO(8:0)
UI
PWRONX
TAHVO
CHSWSTAT
RETU
D2200
RETU_3.02
1.35V
1.35V
2.5V
VREF_INT
VREF
VANA
R2200
100k
R2250
100k
R2201
120k
TAHVO, RF part
SLOWAD(6:0)
RFTEMP
VCHAR
Sleepclock oscillator
B2200
32.768kHz
Backup battery
G2200
DIG_AUDIO(5:0)
CBUS(3:0)
TXC(2:0)
ACI(1:0)
INT_SIM(5:0)
RAPGSM
Battery connector
X2070
VBAT
BSI
GND
~4V
C2070
150u_10V
R2070
14V/50V
EARP
EARN
EAR_P
EAR_N
UI
IHF speaker
E2105
E2106
L2270
L2271
L2108
L2109
56nH
System connector
XAUDIO(7:0)
M2100
FM-0035-C1
Vibra
L2272
L2273
R2104
R2105
4.7V if RF active
1.8V
2.5V
1.8V
2.8V
2.5V
1.35V
VRCP2
VRCP1
VSIM2
VRFC
VR1
VIO
VDRAM
VAUX
VANA
VREF_INT
VREF
RAPGSM
EMINT(1:0)
RF part
TXC_CONV(2:0)
System connector, TAHVO
USB_ACI(7:0)
VSIM1
Depends on SIM 1.8V/3V
SIM connector
R2700
EMIF03-SIM02F2
SIM Reader Side
X2700
SIM
RAPGSM, TAHVO, BT/FM radio
PUSL(7:0)
1
12
6
7
8
15
16
17
14
3

TAHVO


Flash interface
J2060
RXD2
RXD
CLK
TXD
GND
VPP
VBUS
X2060
GND
TAHVO
N2300
TAHVO_V5.2_LF
System connector
CHARGER
D10
E10
E9
VCharIn1
VCharIn2
VCharInK
VPP_VIO
A1
RETU, system connector
USB_ACI(7:0)
Slave_PU
Master_PD1
Master_PD2
CLK
RXD2
D+_RXD
D-_TXD
J10
H9
J9
J6
K7
J7
K8
~4V
VBAT
L2301
220R/100MHz
C2309
22u
C2300
10n
C2301
22u
GND
A7
A6
B5
A4
VBAT1
VBAT1
GND1
GND1
L2306
600R/100MHz
G9
VBAT3
VCCint
K9
C2303
1u0
C2307
1u0
C2306
1u0
A10
B10
A8
C10
B8
NC
R2307
100R
MA21D34001JN
V2302
F10
G10
F9
VCharOut1
VCharOut2
VCharOutK
OEX
FSE0
VO
RCV_FRX2
VP_FRX
VM_CLK
FTX
SLAVESWSET
J4
K4
J5
K2
J3
K3
K5
K6
J2309
J2314
J2310
J2311
J2312
J2313
J2315
INTUSB(8:0)
RAPGSM
Local mode = 1.4V
VCORE
C2302
22u
L2302
10uH
A5
B6
B4
VCoreCoil
VCoreCoil
VCore
RSTX
PURX
SLEEPX
Clk600
SleepClk
SMPSClk
B3
D2
D1
E1
E2
F1
J2308
PUSL(7:0)
RETU, RAPGSM
J8
F2
GND3
GND4
RETU
SLOWAD(6:0)
CHSWSTAT
J2300
D9
J1
VCharADC
ChSwS
VcoreDef
FlashM
TestMode
TestOut
C9
A2
B7
B9
13
A9
GND5
TahvoInt
C2
EMINT(1:0)
CBUS(3:0)
2.5V if accessory connected
5V if USB connected
1.8V
VOUT
VBUS
VIO
H10
K10
A3
Vout
VCC
VIO
CbusData
CbusSelX
CbusClk
C1
B1
B2
C2312
1u0
C2313
1u0
C2304
10n
H2
G2
SENSE-
SENSE+
PWM300
G1
J2316
GenOut1
GenOut2
GenOut3
J2
K1
H1
J2306
J2307
H3
H4
H5
H6
H7
H8
G3
G8
F3
F8
E3
E8
D3
D8
C3
C4
C5
C6
C7
C8
CURRENT_SEN
R2300
C2076
10n
BGND
LED driver
L2304
22uH
L2305
600R/100MHz
VBAT
~4V
C2305
1u0
N2301
4W_LED_DRIVER
PWMTAHVO
A2
C2
C3
A3
EN
IND
PGND
NC
VOUT
VDD
AGND
FB
C1
B1
A1
B3
C2314
4u7
C2315
4u7
L2307
240R/100MHz
VLEDOUT1
SETCURR1
UI
Power supply for keyboard light
14V if lights on
PEMT1
V2401
R2407
47R
R2408
10k
V2402
DTC143ZM-T2L
IN
OUT
R1
4k7
R2
47k
R2424
470R
R2400
470R
V2405
V2400
V2412
V2411
R2402
33R
C2409
4n7
Keyboard LEDs

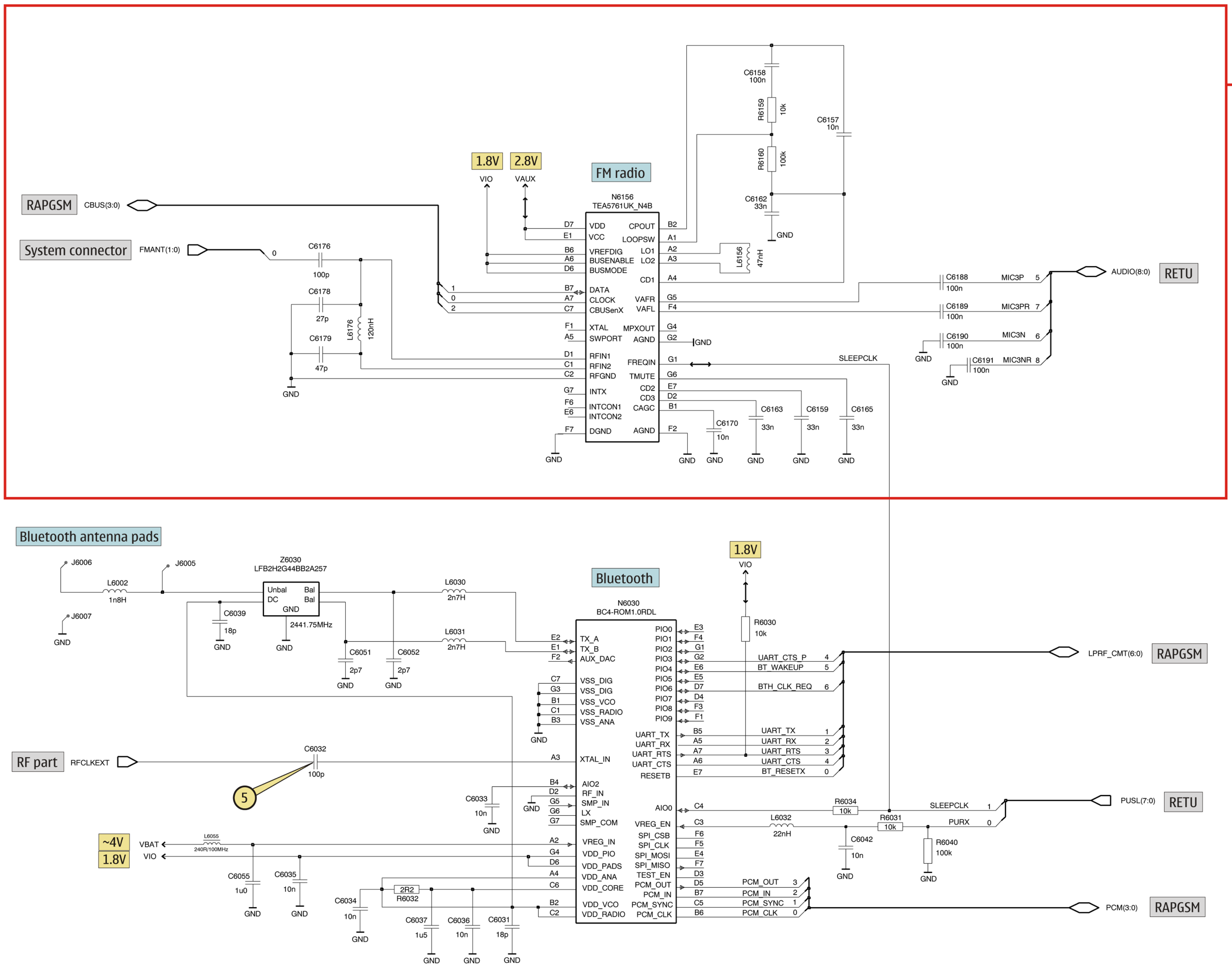
RAPGSM, Combo memory, IrDA


RAPGSM
D2800
RAPGSM_V1.1PA
RF part
RETU, TAHVO
RETU
Bluetooth
TAHVO
RETU, TAHVO, FM radio
UI
Local mode = 1.4V
1.8V
2.8V
~4V
microSD connector
Hall sensor
IrDA
UI
Bluetooth
Combo memory
D3000
2
9
10
11
21
20
19
18

NOTE!
IrDA is only included in

- Nokia 6131 / RM-115
- Nokia 6133 / RM-115

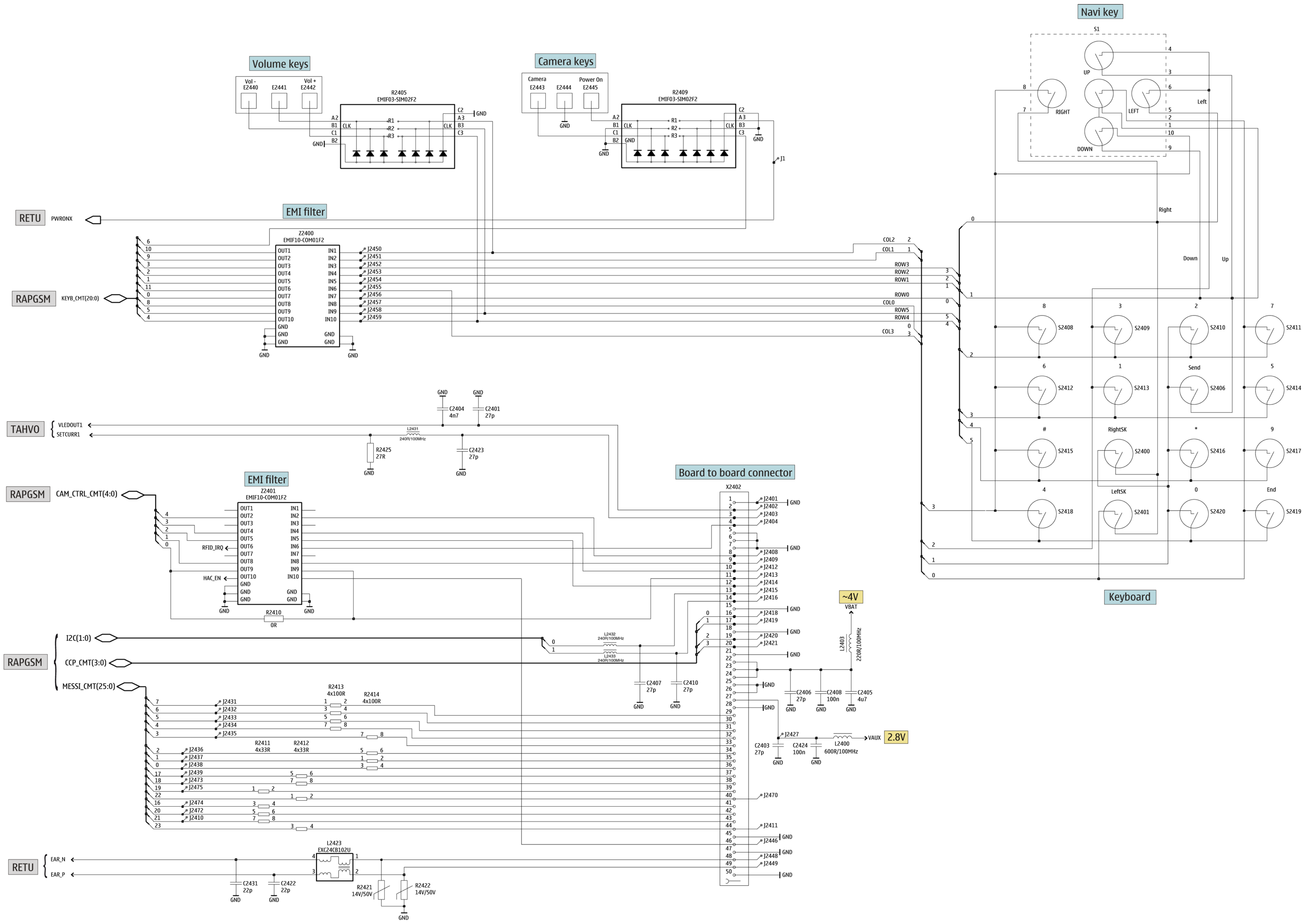
FM radio, Bluetooth


FM radio
N6156
TEA5761UK_N4B
1.8V
VIO
2.8V
VAUX
RAPGSM
CBUS(3:0)
System connector
FMANT(1:0)
C6176
100p
C6178
27p
C6179
47p
L6176
120nH
VDD
VCC
VREFDIG
BUSENABLE
BUSMODE
DATA
CLOCK
CBUSenX
XTAL
SWPORT
RFIN1
RFIN2
RFGND
INTX
INTCON1
INTCON2
DGND
CPOUT
LOOPSW
LO1
LO2
CD1
VAFR
VAFL
MPXOUT
AGND
FREQIN
TMUTE
CD2
CD3
CAGC
C6158
100n
R6159
10k
C6157
10n
R6160
100k
C6162
33n
L6156
47nH
C6188
100n
C6189
100n
C6190
100n
C6191
100n
MIC3P
MIC3PR
MIC3N
MIC3NR
AUDIO(8:0)
RETU
SLEEPCLK
C6170
10n
C6163
33n
C6159
33n
C6165
33n
GND
Bluetooth antenna pads
J6006
J6005
J6007
L6002
1n8H
Z6030
LFB2H2G44BB2A257
Unbal
Bal
DC
2441.75MHz
C6039
18p
C6051
2p7
C6052
2p7
L6030
2n7H
L6031
2n7H
Bluetooth
N6030
BC4-ROM1.0RDL
TX_A
TX_B
AUX_DAC
VSS_DIG
VSS_VCO
VSS_RADIO
VSS_ANA
XTAL_IN
AIO2
RF_IN
SMP_IN
LX
SMP_COM
VREG_IN
VDD_PIO
VDD_PADS
VDD_ANA
VDD_CORE
VDD_VCO
VDD_RADIO
PIO0
PIO1
PIO2
PIO3
PIO4
PIO5
PIO6
PIO7
PIO8
PIO9
UART_TX
UART_RX
UART_RTS
UART_CTS
RESETB
AIO0
VREG_EN
SPI_CSB
SPI_CLK
SPI_MOSI
SPI_MISO
TEST_EN
PCM_OUT
PCM_IN
PCM_SYNC
PCM_CLK
R6030
10k
UART_CTS_P
BT_WAKEUP
BTH_CLK_REQ
BT_RESETX
LPRF_CMT(6:0)
RAPGSM
RF part
RFCLKEXT
C6032
100p
5
C6033
10n
~4V
VBAT
1.8V
VIO
L6055
240R/100MHz
C6055
1u0
C6035
10n
C6034
10n
2R2
R6032
C6037
1u5
C6036
10n
C6031
18p
R6034
10k
R6031
10k
L6032
22nH
C6042
10n
R6040
100k
SLEEPCLK
PURX
PUSL(7:0)
RETU
PCM(3:0)
RAPGSM

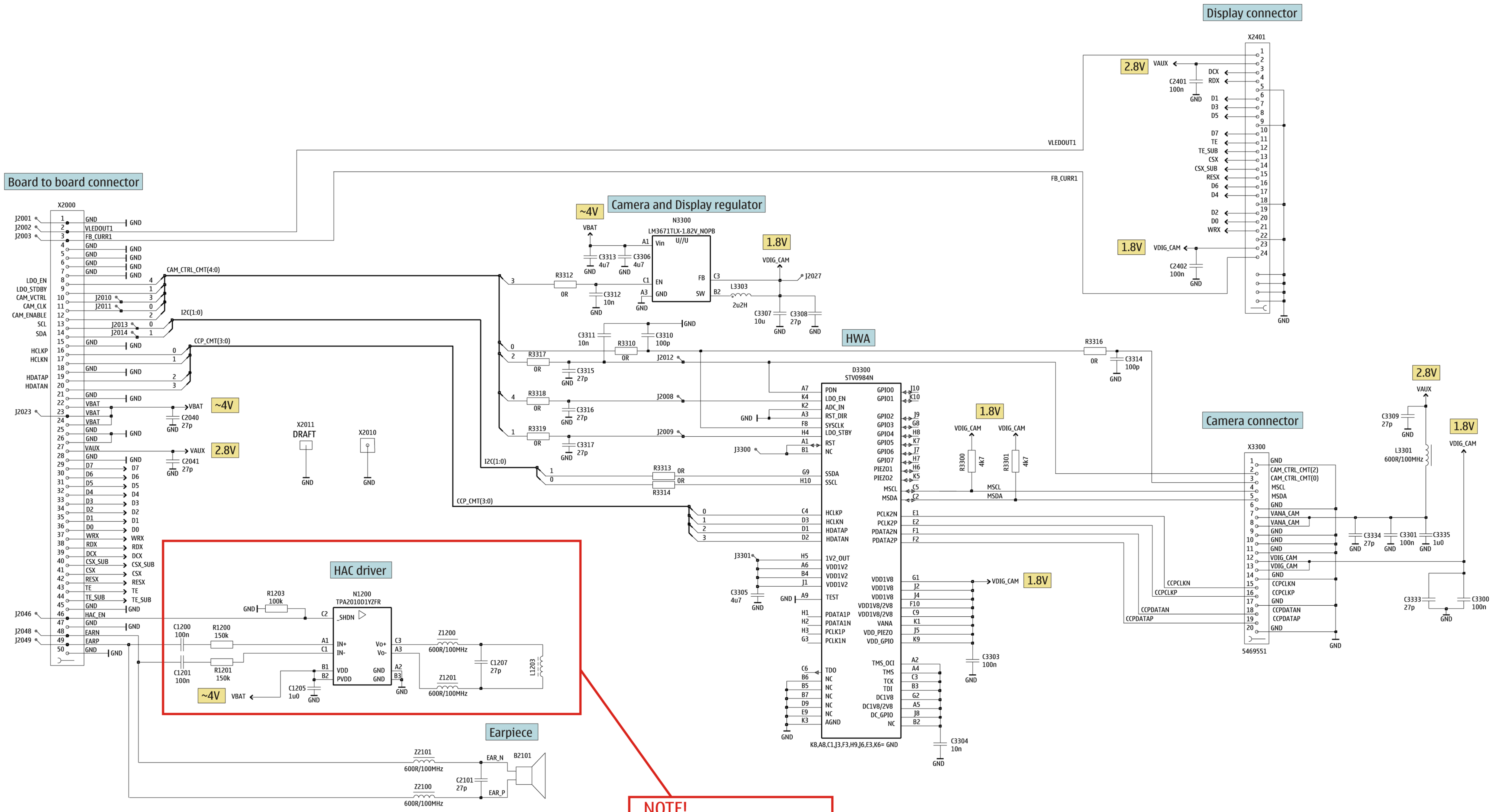
NOTE!
FM radio is only included in

- Nokia 6131 / RM-115
- Nokia 6133 / RM-115
- Nokia 6133 / RM-126

UI


Navi key
S1
UP
RIGHT
LEFT
Left
DOWN
Volume keys
Vol -
E2440
E2441
Vol +
E2442
R2405
EMIF03-SIM02F2
Camera keys
Camera
E2443
E2444
Power On
E2445
R2409
EMIF03-SIM02F2
J1
RETU
PWRONX
EMI filter
Z2400
EMIF10-COM01F2
RAPGSM
KEYB_CMT(20:0)
J2450
J2451
J2452
J2453
J2454
J2455
J2456
J2457
J2458
J2459
COL2
COL1
ROW3
ROW2
ROW1
ROW0
COL0
ROW5
ROW4
COL3
Right
Down
Up
S2408
S2409
S2410
S2411
S2412
S2413
Send
S2406
S2414
#
RightSK
*
S2415
S2400
S2416
S2417
LeftSK
End
S2418
S2401
S2420
S2419
Keyboard
TAHVO
VLEDOUT1
SETCURR1
C2404
4n7
C2401
27p
L2431
240R/100MHz
R2425
27R
C2423
27p
GND
RAPGSM
CAM_CTRL_CMT(4:0)
EMI filter
Z2401
EMIF10-COM01F2
RFID_IRQ
HAC_EN
R2410
0R
Board to board connector
X2402
J2401
J2402
J2403
J2404
J2408
J2409
J2412
J2413
J2414
J2415
J2416
J2418
J2419
J2420
J2421
~4V
VBAT
L2403
220R/100MHz
RAPGSM
I2C(1:0)
CCP_CMT(3:0)
MESSI_CMT(25:0)
L2432
240R/100MHz
L2433
240R/100MHz
C2407
27p
C2410
27p
C2406
27p
C2408
100n
C2405
4u7
J2427
VAUX
2.8V
C2403
27p
C2424
100n
L2400
600R/100MHz
R2413
4x100R
R2414
4x100R
R2411
4x33R
R2412
4x33R
J2431
J2432
J2433
J2434
J2435
J2436
J2437
J2438
J2439
J2473
J2475
J2474
J2472
J2410
J2470
J2411
J2446
J2448
J2449
RETU
EAR_N
EAR_P
L2423
EXC24CB102U
C2431
22p
C2422
22p
R2421
14V/50V
R2422
14V/50V

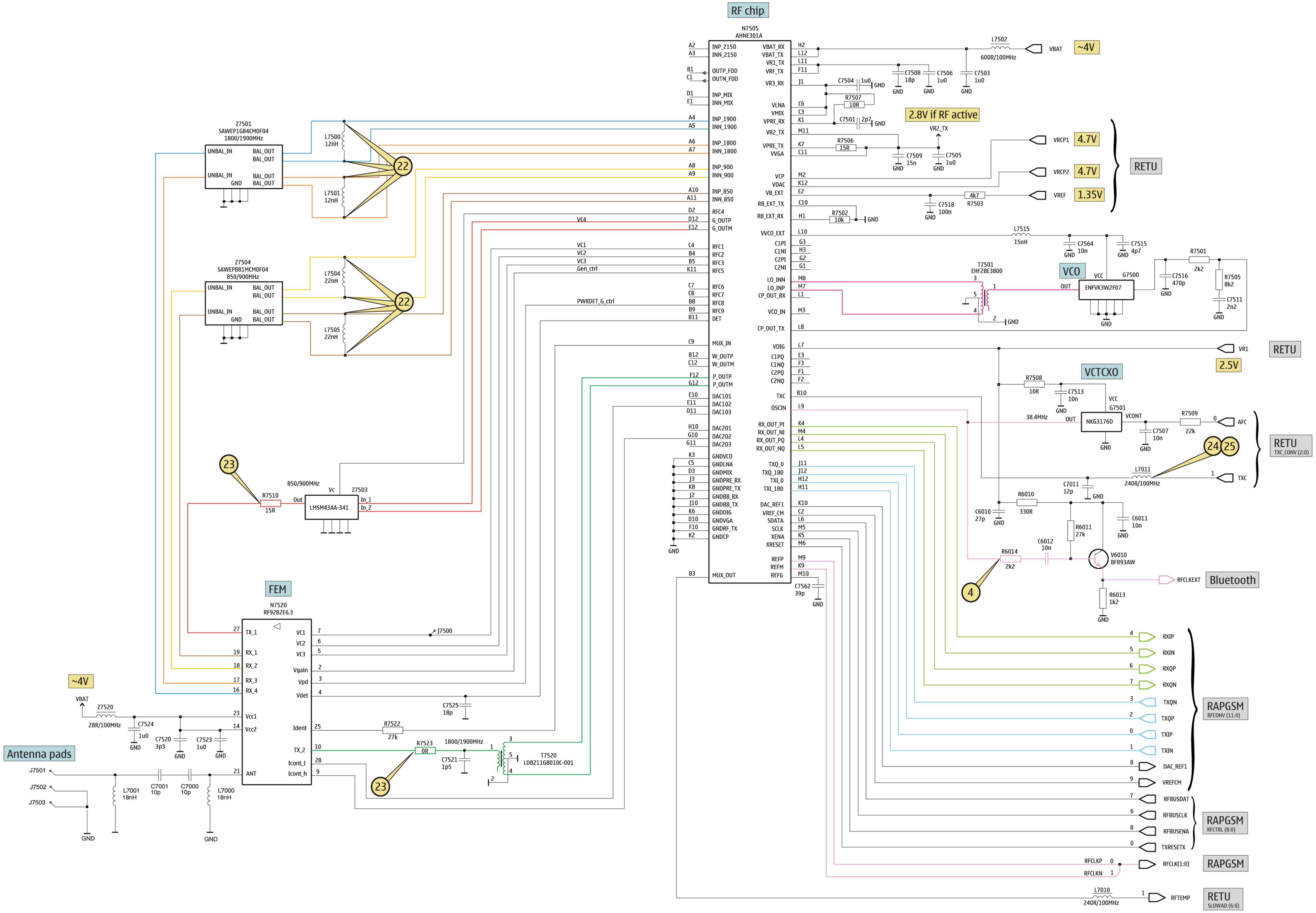
Camera, Earpiece, LCD interface


Display connector
X2401
2.8V
VAUX
C2401 100n
GND
DCX
RDX
D1
D3
D5
D7
TE
TE_SUB
CSX
CSX_SUB
RESX
D6
D4
D2
D0
WRX
1.8V
VDIG_CAM
C2402 100n
VLEDOUT1
FB_CURR1
Board to board connector
X2000
J2001
J2002
J2003
LDO_EN
LDO_STBY
CAM_VCTRL
CAM_CLK
CAM_ENABLE
SCL
SDA
HCLKP
HCLKN
HDATAP
HDATAN
J2023
J2046
J2048
J2049
J2010
J2011
J2013
J2014
CAM_CTRL_CMT(4:0)
I2C(1:0)
CCP_CMT(3:0)
VBAT
~4V
C2040 27p
C2041 27p
2.8V
X2011
DRAFT
X2010
Camera and Display regulator
~4V
N3300
LM3671TLX-1.82V_NOPB
Vin
EN
GND
FB
SW
C3313 4u7
C3306 4u7
R3312 0R
C3312 10n
1.8V
VDIG_CAM
J2027
L3303 2u2H
C3307 10u
C3308 27p
C3311 10n
C3310 100p
R3310 0R
J2012
HWA
R3317 0R
C3315 27p
R3318 0R
C3316 27p
R3319 0R
C3317 27p
J2008
J2009
J3300
R3313 0R
R3314 0R
D3300
STV0984N
PDN
LDO_EN
ADC_IN
RST_DIR
SYSCLK
LDO_STBY
RST
NC
SSDA
SSCL
HCLKP
HCLKN
HDATAP
HDATAN
1V2_OUT
VDD1V2
TEST
PDATA1P
PDATA1N
PCLK1P
PCLK1N
TDO
AGND
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
GPIO7
PIEZO1
PIEZO2
MSCL
MSDA
PCLK2N
PCLK2P
PDATA2N
PDATA2P
VDD1V8
VDD1V8/2V8
VANA
VDD_PIEZO
VDD_GPIO
TMS_OCI
TMS
TCK
TDI
DC1V8
DC1V8/2V8
DC_GPIO
K8,A8,C1,J3,F3,H9,J6,E3,K6= GND
J3301
C3305 4u7
C3303 100n
C3304 10n
R3316 0R
C3314 100p
1.8V
R3300 4k7
R3301 4k7
Camera connector
X3300
5469551
CAM_CTRL_CMT(2)
CAM_CTRL_CMT(0)
MSCL
MSDA
VANA_CAM
VDIG_CAM
CCPCLKN
CCPCLKP
CCPDATAN
CCPDATAP
2.8V
C3309 27p
L3301 600R/100MHz
1.8V
C3334 27p
C3301 100n
C3335 1u0
C3333 27p
C3300 100n
HAC driver
N1200
TPA2010D1YZFR
R1203 100k
_SHDN
C1200 100n
R1200 150k
C1201 100n
R1201 150k
IN+
IN-
VDD
PVDD
Vo+
Vo-
Z1200 600R/100MHz
Z1201 600R/100MHz
C1207 27p
L1203
C1205 1u0
~4V
VBAT
Earpiece
Z2101 600R/100MHz
Z2100 600R/100MHz
C2101 27p
EAR_N
EAR_P
B2101

NOTE!
HAC is only included in

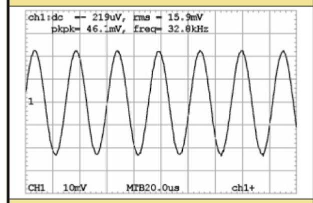
- Nokia 6126h / RM-126
- Nokia 6133h / RM-126

RF part


RF chip
N7505
AHNE301A
INP_2150
INN_2150
OUTP_FDD
OUTN_FDD
INP_MIX
INN_MIX
INP_1900
INN_1900
INP_1800
INN_1800
INP_900
INN_900
INP_850
INN_850
RFC4
G_OUTP
G_OUTM
RFC1
RFC2
RFC3
RFC5
RFC6
RFC7
RFC8
RFC9
DET
MUX_IN
W_OUTP
W_OUTM
P_OUTP
P_OUTM
DAC101
DAC102
DAC103
DAC201
DAC202
DAC203
GNDVCO
GNDLNA
GNDMIX
GNDPRE_RX
GNDPRE_TX
GNDBB_RX
GNDBB_TX
GNDDIG
GNDVGA
GNDRF_TX
GNDCP
MUX_OUT
VBAT_RX
VBAT_TX
VR1_TX
VRF_TX
VR3_RX
VLNA
VMIX
VPRE_RX
VR2_TX
VPRE_TX
VVGA
VCP
VDAC
VB_EXT
RB_EXT_TX
RB_EXT_RX
VVCO_EXT
C1PI
C1NI
C2PI
C2NI
LO_INN
LO_INP
CP_OUT_RX
VCO_IN
CP_OUT_TX
VDIG
C1PQ
C1NQ
C2PQ
C2NQ
TXC
OSCIN
RX_OUT_PI
RX_OUT_NI
RX_OUT_PQ
RX_OUT_NQ
TXQ_0
TXQ_180
TXI_0
TXI_180
DAC_REF1
VREF_CM
SDATA
SCLK
XENA
XRESET
REFP
REFM
REFG
L7502
600R/100MHz
VBAT
~4V
C7508 18p
C7506 1u0
C7503 1u0
C7504 1u0
R7507 10R
C7501 2p7
2.8V if RF active
VR2_TX
R7506 15R
C7509 15n
C7505 1u0
VRCP1
4.7V
VRCP2
4.7V
VREF
1.35V
RETU
4k7
R7503
C7518 100n
R7502 10k
GND
L7515
15nH
C7564 10n
C7515 4p7
T7501
EHF2BE3800
VCO
VCC
G7500
OUT
ENFVK3W2F07
R7501 2k2
C7516 470p
R7505 8k2
C7511 2n2
VR1
RETU
2.5V
VCTCXO
R7508 10R
C7513 10n
G7501
38.4MHz
NKG3176D
VCONT
R7509 22k
C7507 10n
AFC
RETU
TXC_CONV (2:0)
24
25
L7011
240R/100MHz
TXC
C7011 12p
R6010 330R
C6010 27p
R6011 27k
C6011 10n
C6012 10n
R6014 2k2
V6010
BFR93AW
4
RFCLKEXT
Bluetooth
R6013 1k2
C7562 39p
RXIP
RXIN
RXQP
RXQN
TXQN
TXQP
TXIP
TXIN
DAC_REF1
VREFCM
RAPGSM
RFCONV (11:0)
RFBUSDAT
RFBUSCLK
RFBUSENA
TXRESETX
RAPGSM
RFCTRL (8:0)
RFCLKP
RFCLKN
RFCLK(1:0)
RAPGSM
L7010
240R/100MHz
RFTEMP
RETU
SLOWAD (6:0)
Z7501
SAWEP1G84CM0F04
1800/1900MHz
UNBAL_IN
BAL_OUT
L7500 12nH
L7501 12nH
22
Z7504
SAWEP881MCM0F04
850/900MHz
L7504 22nH
L7505 22nH
VC4
VC1
VC2
VC3
Gen_ctrl
PWRDET_G_ctrl
23
R7510 15R
850/900MHz
Out
Vc
Z7503
LMSM43AA-341
In_1
In_2
FEM
N7520
RF9282E6.3
TX_1
RX_1
RX_2
RX_3
RX_4
Vcc1
Vcc2
ANT
VC1
VC2
VC3
Vgain
Vpd
Vdet
Ident
TX_2
Icont_l
Icont_h
J7500
C7525 18p
R7522 27k
R7523 0R
1800/1900MHz
C7521 1p5
T7520
LDB211G8010C-001
VBAT
Z7520
28R/100MHz
C7524 1u0
C7520 3p3
C7523 1u0
Antenna pads
J7501
J7502
J7503
L7001 18nH
C7001 10p
C7000 10p
L7000 18nH

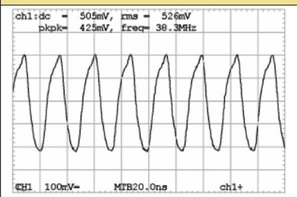
Signal overview

1) 32 kHz at C2208



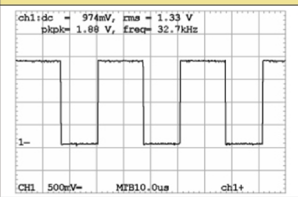
```
ch1:dc  = 219uV, rms = 15.9mV
   pkpk= 46.1mV, freq= 32.8kHz
CH1  10mV     MTB20.0us     ch1+
```

2) RFCLK at J2851



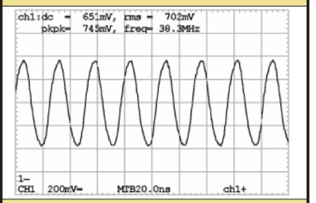
```
ch1:dc  =  505mV, rms =  526mV
   pkpk=  425mV, freq= 38.3MHz
CH1  100mV=   MTB20.0ns     ch1+
```

3) SleepCLK at J2217



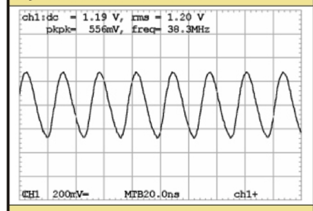
```
ch1:dc  =  974mV, rms = 1.33 V
   pkpk= 1.88 V, freq= 32.7kHz
CH1  500mV=   MTB10.0us     ch1+
```

4) VCTCXO 38.4 MHz at R6014



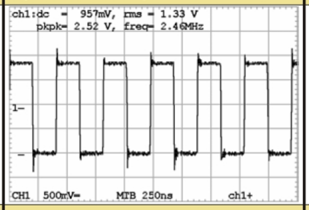
```
ch1:dc  =  651mV, rms =  702mV
   pkpk=  745mV, freq= 38.3MHz
CH1  200mV=   MTB20.0ns     ch1+
```

5) RFCLKEXT at C6032



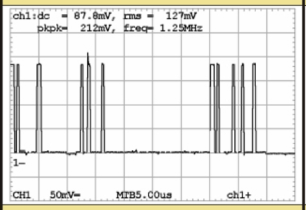
```
ch1:dc  = 1.19 V, rms = 1.20 V
   pkpk=  556mV, freq= 38.3MHz
CH1  200mV=   MTB20.0ns     ch1+
```

6) CBUSCLK at J2206



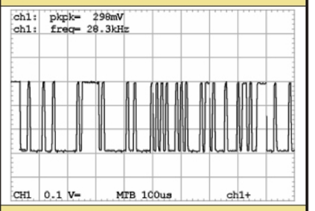
```
ch1:dc  =  957mV, rms = 1.33 V
   pkpk= 2.52 V, freq= 2.46MHz
CH1  500mV=   MTB 250ns     ch1+
```

7) CBUSDA at J2207



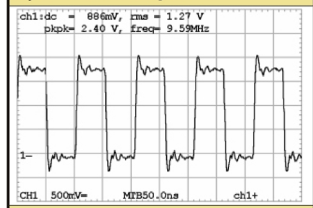
```
ch1:dc  = 87.8mV, rms =  127mV
   pkpk=  212mV, freq= 1.25MHz
CH1  50mV=    MTB5.00us     ch1+
```

8) CBUSENX at J2209



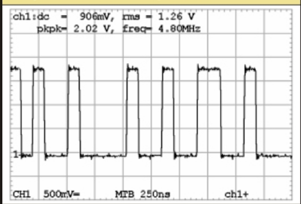
```
ch1:  pkpk=  298mV
ch1:  freq= 28.3kHz
CH1  0.1 V=   MTB 100us     ch1+
```

9) RFBUSCLK at J2833



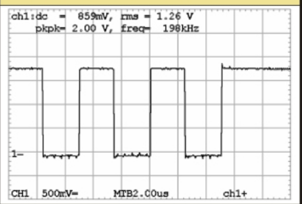
```
ch1:dc  =  886mV, rms = 1.27 V
   pkpk= 2.40 V, freq= 9.59MHz
CH1  500mV=   MTB50.0ns     ch1+
```

10) RFBUSDA at J2834



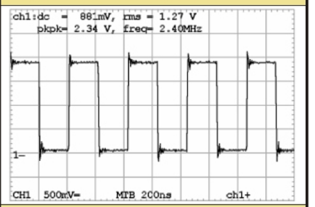
```
ch1:dc  =  906mV, rms = 1.26 V
   pkpk= 2.02 V, freq= 4.80MHz
CH1  500mV=   MTB 250ns     ch1+
```

11) RFBUSENX at J2835



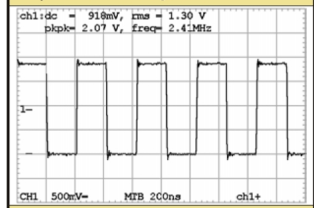
```
ch1:dc  =  859mV, rms = 1.26 V
   pkpk= 2.00 V, freq=  198kHz
CH1  500mV=   MTB2.00us     ch1+
```

12) AUDIOCLK at J2200



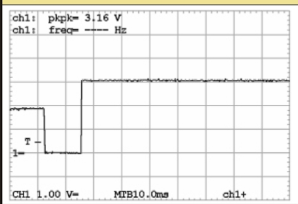
```
ch1:dc  =  881mV, rms = 1.27 V
   pkpk= 2.34 V, freq= 2.40MHz
CH1  500mV=   MTB 200ns     ch1+
```

13) SMPSCLK at J2308



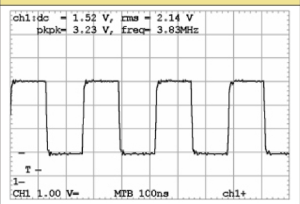
```
ch1:dc  =  918mV, rms = 1.30 V
   pkpk= 2.07 V, freq= 2.41MHz
CH1  500mV=   MTB 200ns     ch1+
```

14) VSIM at C2212



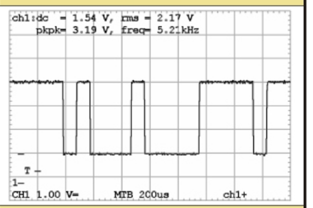
```
ch1:  pkpk= 3.16 V
ch1:  freq= ---- Hz
CH1 1.00 V=   MTB10.0ms     ch1+
```

15) SIMCLK at J2213



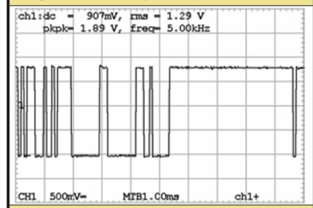
```
ch1:dc  = 1.52 V, rms = 2.14 V
   pkpk= 3.23 V, freq= 3.83MHz
CH1 1.00 V=   MTB 100ns     ch1+
```

16) SIMDA at J2214



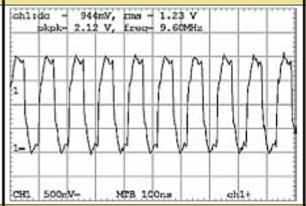
```
ch1:dc  = 1.54 V, rms = 2.17 V
   pkpk= 3.19 V, freq= 5.21kHz
CH1 1.00 V=   MTB 200us     ch1+
```

17) SIMIOC at J2215



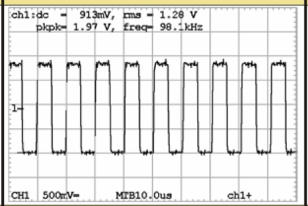
```
ch1:dc  =  907mV, rms = 1.29 V
   pkpk= 1.89 V, freq= 5.00kHz
CH1  500mV=   MTB1.00ms     ch1+
```

18) CAMERACLK at R3314



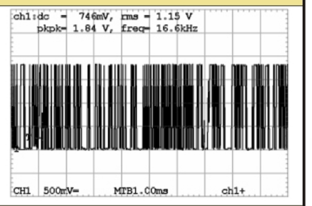
```
ch1:dc  =  944mV, rms = 1.23 V
   pkpk= 2.12 V, freq= 9.60MHz
CH1  500mV=   MTB 100ns     ch1+
```

19) CAMERASCL at J2804



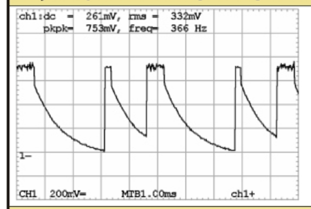
```
ch1:dc  =  913mV, rms = 1.28 V
   pkpk= 1.97 V, freq= 98.1kHz
CH1  500mV=   MTB10.0us     ch1+
```

20) CAMERASDA at J2803



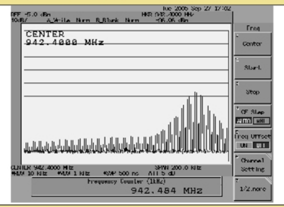
```
ch1:dc  =  746mV, rms = 1.15 V
   pkpk= 1.84 V, freq= 16.6kHz
CH1  500mV=   MTB1.00ms     ch1+
```

21) RXIQ GSM 900 at J2828-J2831



```
ch1:dc  =  261mV, rms =  332mV
   pkpk=  753mV, freq=  366 Hz
CH1  200mV=   MTB1.00ms     ch1+
```

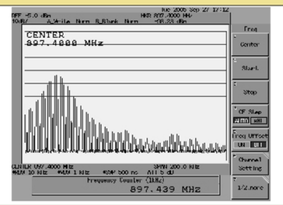
22) RX at L7500, L7501, L7504, L7505



```
CENTER
942.4000 MHz
Frequency Counter (1kHz)
942.484 MHz
```

Freq
Center
Start
Stop
CF Step
Freq Offset
Channel Setting
1/2 more

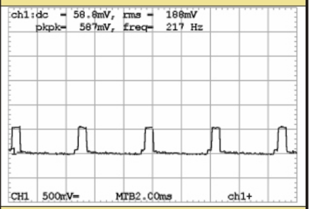
23) TX at R7510, R7523



```
CENTER
897.4000 MHz
Frequency Counter (1kHz)
897.439 MHz
```

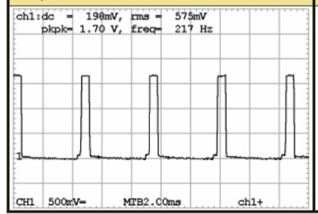
Freq
Center
Start
Stop
CF Step
Freq Offset
Channel Setting
1/2 more

24) TXC GSM900 PL19 at L7011



```
ch1:dc  = 58.8mV, rms =  188mV
   pkpk=  587mV, freq=  217 Hz
CH1  500mV=   MTB2.00ms     ch1+
```

25) TXC GSM900 PL5 at L7011

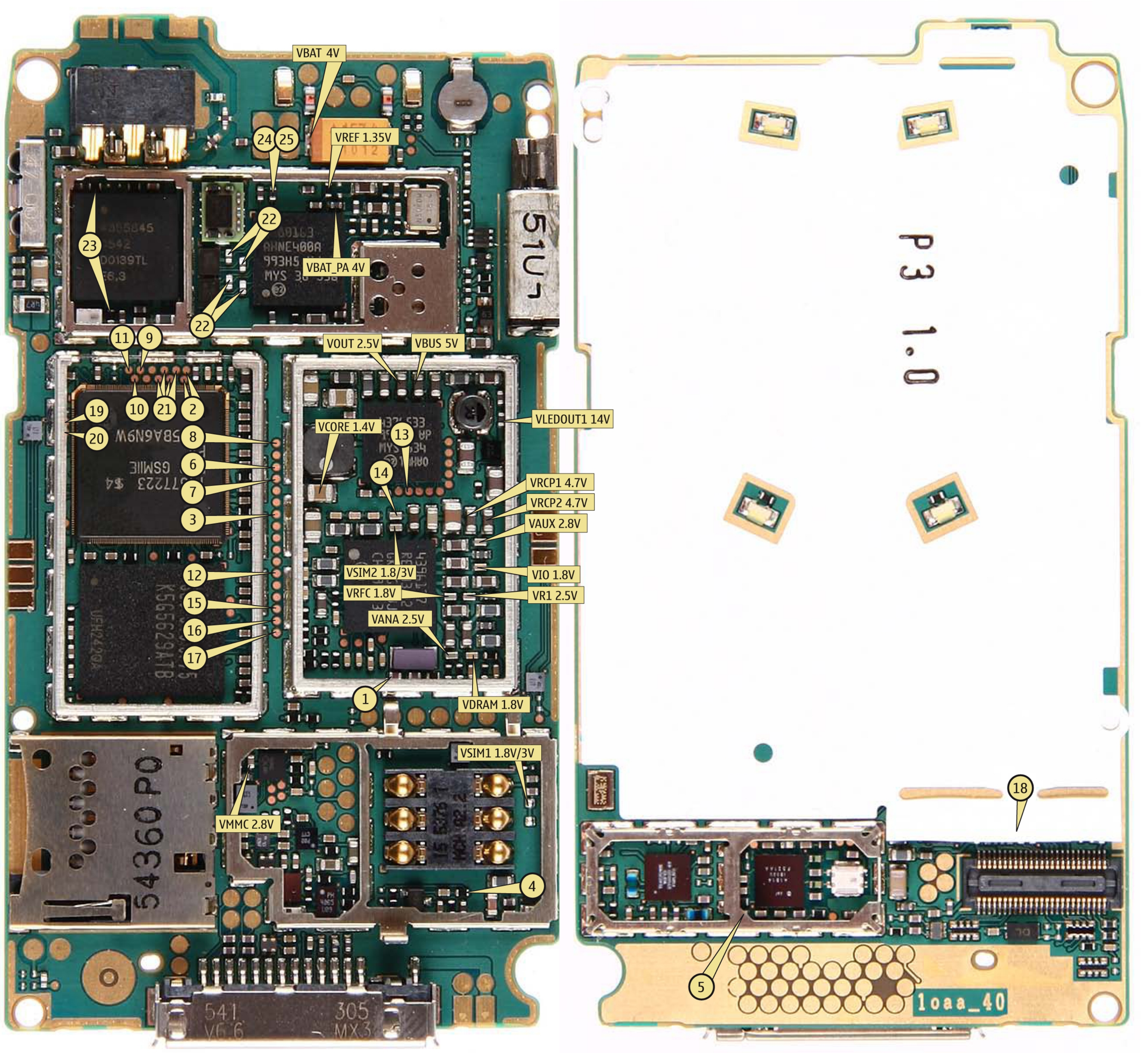


```
ch1:dc  =  198mV, rms =  575mV
   pkpk= 1.70 V, freq=  217 Hz
CH1  500mV=   MTB2.00ms     ch1+
```

26)

27)

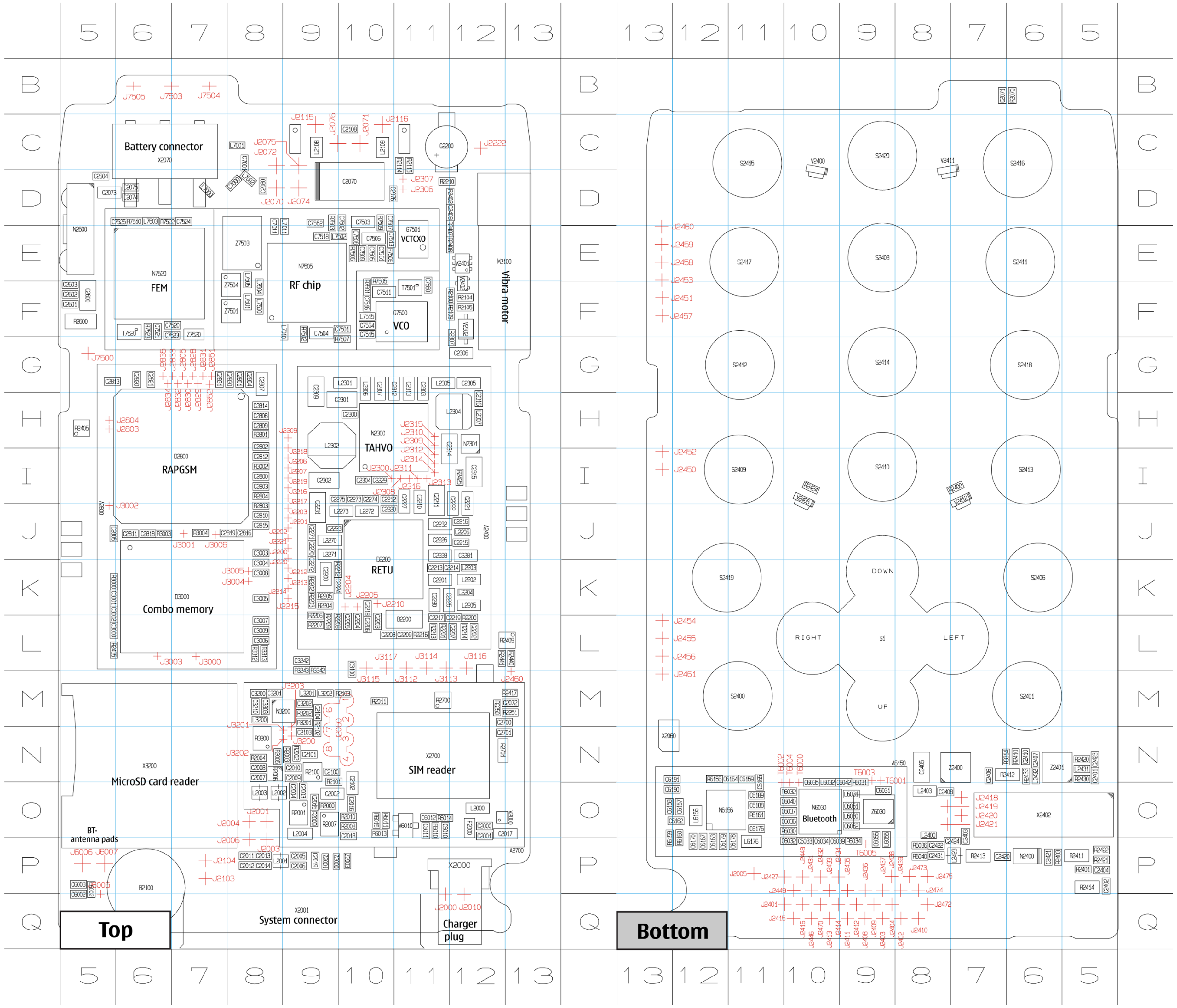
28)



VBAT 4V
24
25
VREF 1.35V
23
22
VBAT_PA 4V
22
11
9
VOUT 2.5V
VBUS 5V
19
10
21
2
20
8
6
7
3
VCORE 1.4V
13
VLEDOUT1 14V
14
VRCP1 4.7V
VRCP2 4.7V
VAUX 2.8V
VIO 1.8V
VSIM2 1.8/3V
VRFC 1.8V
VR1 2.5V
VANA 2.5V
12
15
16
17
1
VDRAM 1.8V
VSIM1 1.8V/3V
VMMC 2.8V
4
18
5

Component finder (lower block)

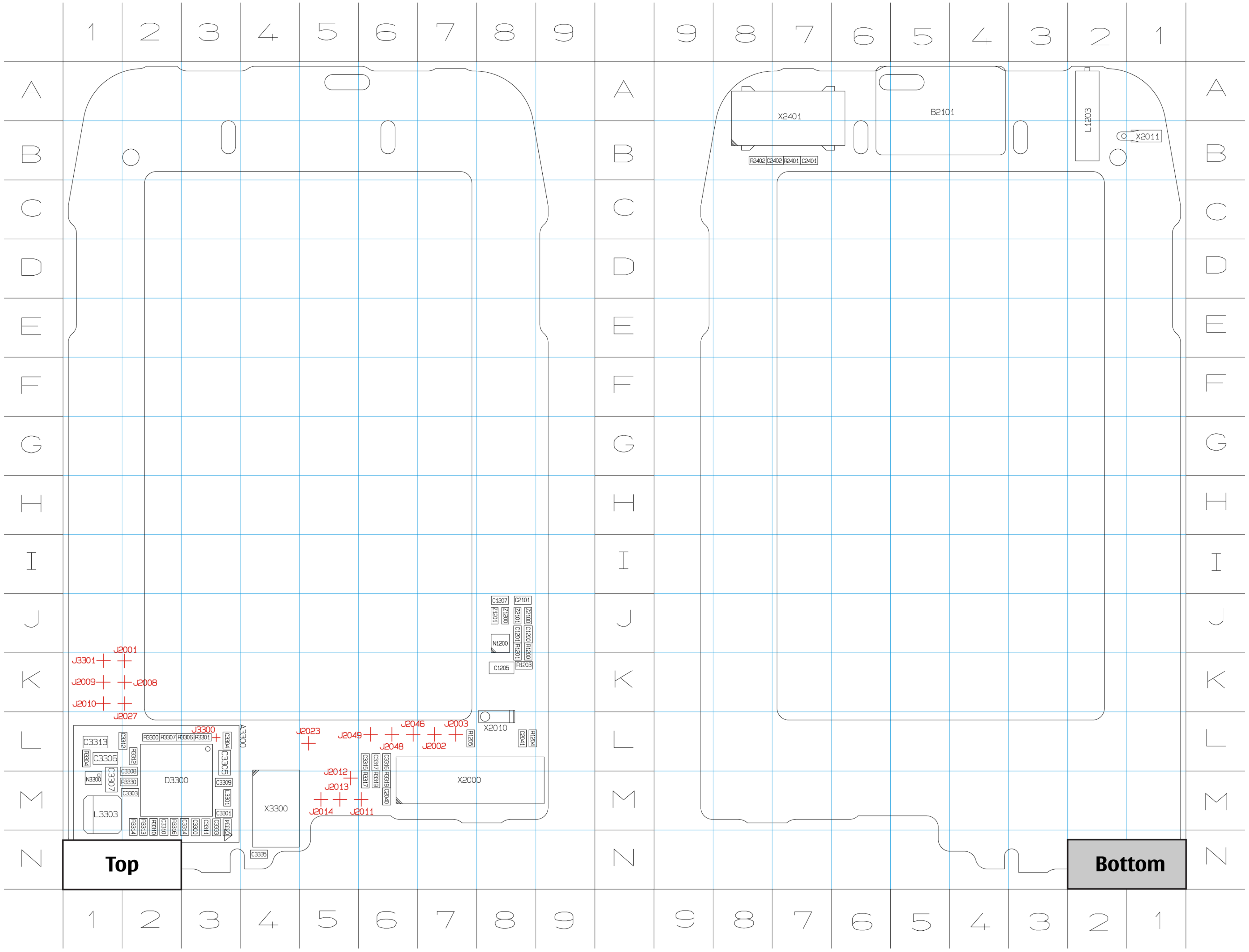
B	
B2100	P7
B2200	K11
C	
C2000	O13
C2001	O13
C2002	N10
C2003	N9
C2004	N9
C2005	P9
C2006	P9
C2007	N9
C2008	N9
C2009	N9
C2010	N9
C2011	P8
C2012	P8
C2013	P9
C2014	P9
C2015	O10
C2016	O10
C2017	O13
C2018	O10
C2019	P10
C2070	C10
C2071	B7
C2072	M13
C2073	D6
C2074	D6
C2075	D6
C2076	D11
C2080	C9
C2100	N10
C2101	N10
C2102	N10
C2103	M9
C2104	M10
C2108	B10
C2200	J10
C2201	K12
C2202	L13
C2203	K11
C2204	K10
C2205	K10
C2206	K11
C2207	L12
C2208	L11
C2209	L11
C2210	I12
C2211	I12
C2212	I11
C2213	J12
C2214	J12
C2215	J12
C2216	J12
C2217	K12
C2218	K11
C2219	K12
C2220	I11
C2221	I12
C2222	I12
C2223	J10
C2224	K10
C2225	K12
C2226	J12
C2227	I11
C2228	J12
C2229	I11
C2230	K12
C2231	I10
C2232	J12
C2270	J10
C2271	J10
C2272	J10
C2273	I10
C2274	I11
C2275	I10
C2281	J12
C2300	H10
C2301	G10
C2302	I10
C2303	G12
C2304	I11
C2305	G12
C2306	G12
C2307	G11
C2309	G10
C2312	G11
C2313	G11
C2314	H12
C2315	I13
C2316	G13
C2401	N5
C2402	P5
C2403	O8
C2404	P5
C2405	N9
C2406	N7
C2407	N6
C2408	N8
C2409	D12
C2410	N6
C2420	O7
C2421	O6
C2422	O8
C2423	N5
C2424	O8
C2431	O8
C2600	E6
C2601	F5
C2602	E5
C2603	E5
C2604	C6
C2700	M13
C2701	M13
C2800	I9
C2801	G8
C2802	H9
C2803	I9
C2804	G8
C2805	J6
C2807	G9
C2808	H9
C2809	H9
C2810	I9
C2811	J6
C2812	H9
C2813	G6
C2814	G9
C2815	J9
C2816	J8
C2818	J7
C2819	J8
C2820	G6
C2821	G7
C2830	G8
C2831	G8
C3000	K6
C3001	K6
C3002	K6
C3003	J9
C3004	J9
C3005	K9
C3006	L9
C3007	K9
C3008	J9
C3009	K9
C3100	L10
C3200	M9
C3201	M9
C3202	M9
C3210	M9
C3242	L9
C3303	M9
C6002	P5
C6003	P5
C6010	O12
C6011	O12
C6012	O12
C6031	N9
C6032	O11
C6033	O11
C6034	O10
C6035	N11
C6036	O11
C6037	O11
C6039	O10
C6040	N11
C6042	N10
C6051	O10
C6052	O10
C6055	O9
C6157	O13
C6158	O13
C6159	N12
C6162	O13
C6163	O12
C6164	N12
C6165	N11
C6167	O12
C6170	O13
C6176	O12
C6178	O12
C6179	O12
C6188	O12
C6189	N12
C6190	N13
C6191	N13
C7000	D8
C7001	C8
C7011	D8
C7501	F10
C7502	D10
C7503	D11
C7504	F10
C7505	E11
C7506	D11
C7507	D11
C7508	D10
C7509	E10
C7511	E11
C7513	D11
C7515	F11
C7516	F11
C7518	D10
C7520	F7
C7521	F7
C7523	F7
C7524	D7
C7525	D6
C7562	D9
C7564	F10
D	
D2200	J11
D2800	H7
D3000	K7
E	
E2105	C9
E2106	C11
E2440	J5
E2441	J5
E2442	J5
E2443	J13
E2444	I13
E2445	I13
F	
F2000	O12
G	
G2200	C12
G7500	F11
G7501	D11
J	
J2000	P12
J2001	O9
J2003	O9
J2004	O8
J2005	P12
J2006	O8
J2010	P12
J2060	M10
J2070	D9
J2071	C10
J2072	C9
J2074	D9
J2075	C9
J2076	C10
J2103	P8
J2104	P8
J2115	B10
J2116	B11
J2200	J9
J2201	I9
J2202	J9
J2203	I9
J2204	K10
J2205	K10
J2206	H9
J2207	I9
J2209	H9
J2210	K11
J2212	J9
J2213	K9
J2214	K9
J2215	K9
J2216	I9
J2217	I9
J2218	H9
J2219	I9
J2220	J9
J2221	J9
J2222	C13
J2300	I11
J2306	D11
J2307	C11
J2308	I11
J2309	H12
J2310	H12
J2311	I11
J2312	I12
J2313	I12
J2314	I12
J2315	H12
J2316	I11
J2401	P11
J2402	Q9
J2403	Q9
J2404	P9
J2408	Q10
J2409	P9
J2410	Q9
J2411	Q10
J2412	P10
J2413	Q10
J2414	P10
J2415	Q11
J2416	P11
J2418	N8
J2419	O8
J2420	O8
J2421	O8
J2427	P11
J2431	N5
J2432	N6
J2433	N6
J2434	P10
J2435	P10
J2436	P10
J2437	P9
J2438	P9
J2439	P9
J2446	Q11
J2448	P11
J2449	P11
J2450	I13
J2451	E13
J2452	H13
J2453	E13
J2454	K13
J2455	L13
J2456	L13
J2457	F13
J2458	E13
J2459	D13
J2460	L13
J2460	D13
J2461	L13
J2470	P10
J2472	P8
J2473	P9
J2474	P9
J2475	P8
J2803	H6
J2804	H6
J2805	G7
J2828	G7
J2829	G8
J2830	G7
J2831	G8
J2832	G7
J2833	G7
J2834	G7
J2835	G7
J2851	G8
J2852	G8
J3000	L8
J3001	J7
J3002	I6
J3003	L7
J3004	K8
J3005	J8
J3006	J8
J3112	L11
J3113	L12
J3114	L12
J3115	L11
J3116	L12
J3117	L11
J3200	M9
J3201	M9
J3202	N9
J3203	M9
J6005	P6
J6006	P5
J6007	P6
J7500	G6
J7503	B7
J7504	B8
J7505	B6
L	
L2000	O13
L2001	P9
L2002	N9
L2003	N9
L2004	O9
L2108	C10
L2109	C11
L2202	K12
L2203	J12
L2204	K12
L2205	K12
L2206	J12
L2270	J10
L2271	J10
L2272	I11
L2273	I10
L2301	G10
L2302	H10
L2304	H12
L2305	G12
L2306	G11
L2307	H13
L2400	O8
L2403	N9
L2423	O8
L2431	N2
L2432	N3
L2433	N3
L3200	M9
L3201	M10
L3202	M9
L6002	P6
L6030	O10
L6031	N10
L6032	N10
L6055	O9
L6156	O13
L6176	O12
L7000	D7
L7001	C8
L7010	F9
L7011	E9
L7500	F9
L7501	F8
L7502	D10
L7503	D7
L7504	E9
L7505	E8
L7515	F11
M	
M2100	E13
N	
N2300	H11
N2301	H12
N2400	O7
N2600	D5
N3200	M9
N6030	O10
N6156	O12
N7505	E10
N7520	E7
R	
R2000	O10
R2001	O9
R2002	N9
R2003	N9
R2004	N9
R2005	N9
R2006	N9
R2007	O10
R2008	O10
R2009	O10
R2010	O10
R2011	M11
R2070	B7
R2100	N10
R2101	N10
R2102	M10
R2103	M10
R2104	F12
R2105	F12
R2108	E12
R2109	F12
R2114	C11
R2115	C11
R2200	K12
R2201	L12
R2202	K10
R2203	K10
R2204	K10
R2205	K10
R2206	K10
R2207	K10
R2208	K10
R2209	K10
R2210	C12
R2212	J10
R2213	L12
R2214	L12
R2216	L12
R2250	M13
R2251	M13
R2307	F12
R2400	I8
R2401	P6
R2402	D12
R2403	O6
R2405	H5
R2407	D12
R2408	E12
R2409	L13
R2410	N7
R2411	O6
R2412	N7
R2413	O8
R2414	P6
R2417	M13
R2420	N6
R2421	P5
R2422	O5
R2424	I11
R2425	I12
R2430	N6
R2435	L6
R2440	L13
R2441	L13
R2600	F5
R2700	M12
R2701	N13
R2801	H9
R2803	I9
R2804	I9
R3000	K6
R3002	I9
R3003	J7
R3004	J8
R3200	M9
R3201	M9
R3202	M9
R3242	L10
R3243	L9
R3312	L9
R3313	L9
R3314	N7
R6010	O12
R6011	O11
R6013	O11
R6014	O12
R6015	O11
R6030	O11
R6031	N10
R6032	N11
R6034	O10
R6036	O9
R6040	O9
R6156	N12
R6159	O13
R6160	O13
R6161	O12
R7001	C8
R7501	E11
R7502	F9
R7503	D10
R7505	E11
R7506	E10
R7507	F10
R7508	E11
R7509	D11
R7510	D6
R7522	D7
R7523	F7
T	
T7501	E11
T7520	F6
V	
V2000	O13
V2302	F12
V2400	C10
V2401	E12
V2402	E12
V2405	I11
V2411	C8
V2412	I8
V6010	O11
X	
X2000	P12
X2001	P9
X2060	M13
X2070	C7
X2402	O6
X2700	N12
X3200	N7
Z	
Z2000	P10
Z2001	P10
Z2003	P10
Z2400	N8
Z2401	N6
Z6030	O9
Z7501	F8
Z7503	E8
Z7504	E8
Z7520	F7



Component finder (upper block)

B	
B2101	A5
C	
C1200	J8
C1201	J8
C1205	K8
C1207	J8
C2040	M6
C2041	L8
C2101	J8
C2401	B7
C2402	B7
C3300	M3
C3301	M3
C3303	M2
C3304	L3
C3305	L3
C3306	L1
C3307	M1
C3308	M2
C3309	M3
C3310	M2
C3311	M3
C3312	L2
C3313	L1
C3314	M3
C3315	L6
C3316	L6
C3317	L6
C3333	M3
C3334	M3
C3335	N4
D	
D3300	M2
L	
L1203	A2
L3301	M3
L3303	M1

N	
N1200	J8
N3300	M1
R	
R1200	J8
R1201	J8
R1203	K8
R1204	L8
R1205	L7
R2401	B7
R2402	B8
R3300	L2
R3301	L3
R3304	L1
R3306	L3
R3307	L2
R3310	M2
R3312	L2
R3313	M2
R3314	M2
R3316	M2
R3317	M6
R3318	M6
R3319	M6
R3330	M2
X	
X2000	M7
X2010	L8
X2401	A7
X3300	M4
Z	
Z1200	J8
Z1201	J8
Z2100	J8
Z2101	J8


1 2 3 4 5 6 7 8 9
9 8 7 6 5 4 3 2 1
A B C D E F G H I J K L M N
Top
Bottom
J3301
J2001
J2009
J2008
J2010
J2027
J3300
C3313
C3306
N3300
C3307
L3303
D3300
X3300
C3335
J2023
J2049
J2046
J2003
J2048
J2002
J2012
J2013
J2014
J2011
X2010
X2000
C1207
C2101
N1200
C1205
R1203
X2401
B2101
L1203
X2011
R2402
C2402
R2401
C2401

Glossary

(This page left intentionally blank.)

A/D-converter	Analog-to-digital converter
ACI	Accessory Control Interface
ADC	Analog-to-digital converter
ADSP	Application DPS (expected to run high level tasks)
AGC	Automatic gain control (maintains volume)
ALS	Ambient light sensor
AMSL	After Market Service Leader
ARM	Advanced RISC Machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application Specific Integrated Circuit
ASIP	Application Specific Interface Protector
B2B	Board to board, connector between PWB and UI board
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic ,type of filter function)
BSI	Battery Size Indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP_WD2,UEME and Zocus
CCP	Compact Camera Port
CDSP	Cellular DSP (expected to run at low levels)
CLDC	Connected limited device configuration
CMOS	Complimentary metal-oxide semiconductor circuit (low power consumption)
COF	Chip on Foil
COG	Chip on Glass
CPU	Central Processing Unit
CSR	cambridge silicon radio
CSTN	Color Super Twisted Nematic
CTSI	Clock Timing Sleep and interrupt block of Tiku
CW	Continuous wave
D/A-converter	Digital-to-analouge converter
DAC	Digital-to-analouge converter
DBI	Digital Battery Interface
DBus	DSP controlled serial bus connected between UPP_WD2 and Helgo
DCT-4	Digital Core Technology
DMA	Direct memory access
DP	Data Package

DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DtoS	Differential to Single ended
EDGE	Enhanced data rates for global/GSM evaluation
EGSM	Extended GSM
EM	Energy management
EMC	Electromagnetic compability
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FCI	Functional cover interface
FPS	Flash Programming Tool
FR	Full rate
FSTN	Film compensated super twisted nematic
GND	Ground, conductive mass
GPIB	General-purpose interface bus
GPRS	General Packet Radio Service
GSM	Group Special Mobile/Global System for Mobile communication
HF	Hands free
HFCM	Handsfree Common
HS	Handset
HSCSD	High speed circuit switched data (data transmission connection faster than GSM)
HW	Hardware
I/O	Input/Output
IBAT	Battery current
IC	Integrated circuit
ICHAR	Charger current
IF	Interface
IHF	Integrated hands free
IMEI	International Mobile Equipment Identity
IR	Infrared
IrDA	Infrared Data Associasion
ISA	Intelligent software architecture
JPEG/JPG	Joint Photographic Experts Group
LCD	Liquid Crystal Display
LDO	Low Drop Out
LED	Light-emitting diode

LPRF	Low Power Radio Frequency
MCU	Micro Controller Unit (microprocessor)
MCU	Multiport control unit
MIC, mic	Microphone
MIDP	Mobile Information Device Profile
MIN	Mobile identification number
MIPS	Million instructions per second
MMC	Multimedia card
MMS	Multimedia messaging service
NTC	Negative temperature coefficient, temperature sensitive resistor used as a temperature sensor
OMA	Object management architechture
OMAP	Operations, maintenance, and administartion part
Opamp	Operational Amplifier
PA	Power amplifier
PDA	Pocket Data Application
PDA	Personal digital assistant
PDRAM	Program/Data RAM (on chip in Tiku)
Phoenix	Software tool of DCT4.x
PIM	Personal Information Management
PLL	Phase locked loop
PM	(Phone) Permanent memory
PUP	General Purpose IO (PIO), USARTS and Pulse Width Modulators
PURX	Power-up reset
PWB	Printed Wiring Board
PWM	Pulse width modulation
RC-filter	Resistance-Capacitance filter
RF	Radio Frequency
RF PopPort TM	Reduced function PopPortTM interface
RFBUS	Serial control Bus For RF
RSK	Right Soft Key
RS-MMC	Reduced size Multi Media Card
RSSI	Receiving signal strength indicator
RST	Reset Switch
RTC	Real Time Clock (provides date and time)
RX	Radio Receiver

SARAM	Single Access RAM
SAW filter	Surface Acoustic Wave filter
SDRAM	Synchronous Dynamic Random Access Memory
SID	Security ID
SIM	Subscriber Identity Module
SMPS	Switched Mode Power Supply
SNR	Signal-to-noice ratio
SPR	Standard Product requirements
SRAM	Static random access memory
STI	Serial Trace Interface
SW	Software
SWIM	Subscriber/Wallet Identification Module
TCXO	Temperature controlled Oscillator
Tiku	Finnish for Chip, Successor of the UPP, Official Tiku3G
TX	Radio Transmitter
UART	Universal asynchronous receiver/transmitter
UEME	Universal Energy Management chip (Enhanced version)
UEMEK	See UEME
UI	User Interface
UPP	Universal Phone Processor
UPP_WD2	Communicator version of DCT4 system ASIC
USB	Universal Serial Bus
VBAT	Battery voltage
VCHAR	Charger voltage
VCO	Voltage controlled oscillator
VCTCXO	Voltage Controlled Temperature Compensated Crystal Oscillator
VCXO	Voltage Controlled Crystal Oscillator
Vp-p	Peak-to-peak voltage
VSIM	SIM voltage
WAP	Wireless application protocol
WD	Watchdog
XHTML	Extensible hypertext markup language
Zocus	Current sensor, (used to monitor the current flow to and from the battery)